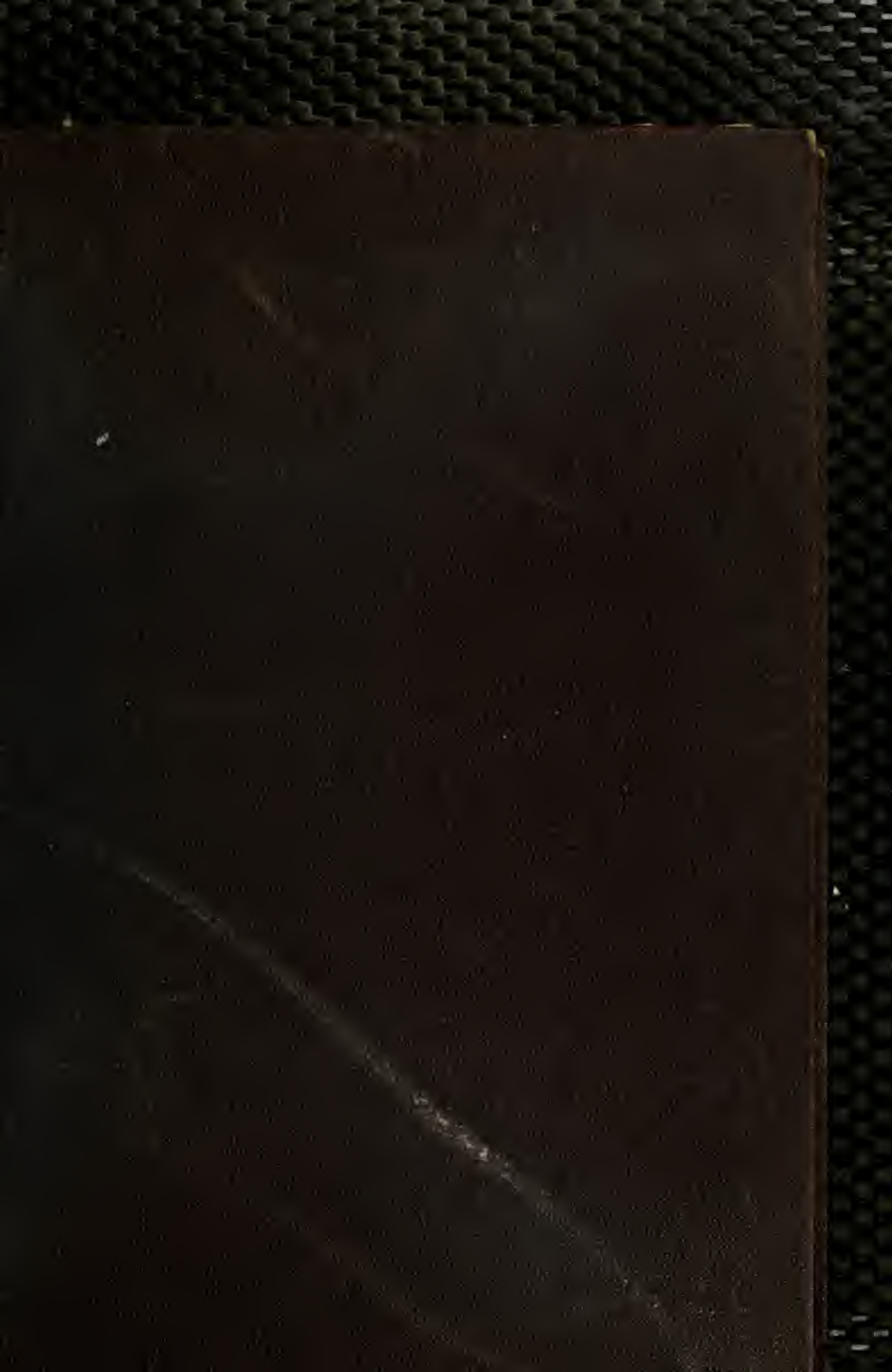




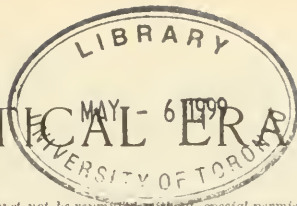
KS
1

D7532

V. 19-20

THE PHARMACEUTICAL ERA

[WEEKLY.]



The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, JANUARY 6, 1898.

No. 1.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York.
By D. O. HAYNES & Co.

Subscription Rates: U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 4454 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

	PAGE		PAGE
EDITORIAL.....	1	Druggists' Denounce	20
CORRESPONDENCE.....	3	Merck's Pharmacy.....	22
Phenacetine Litigation.....	4	Searle & Hereth Celebrate	22
Animal Substances as Remedial Agents.....	5	Wisconsin Poison Law and Proprietors.....	22
Microbe of Yellow Fever.....	6	News Letters.....	23
Manufacture and Properties of Carburendum.....	7	BUSINESS RECORD.....	28
Pumice Stone.....	9	BOOK REVIEWS.....	29
Liquefaction of Fluorine.....	10	PATENTS, TRADEMARKS, ETC.....	30
Structure of Bacteria.....	11	TRADE DEPARTMENT.....	31
PHARMACY.....	12	State of Trade.....	31
QUESTION BOX.....	15	New York Markets.....	32
NEWS DEPARTMENT.....	17	DRUGGISTS' ADVERTISING.....	33
New Board of Pharmacy.....	17	PRICES CURRENT.....	35
Gerrish & Schindler Go Free.....	18	TRADE NOTES.....	38
Scott & Bowne's Side.....	19		

"The British and Colonial Druggist," London.

Subscriptions and advertisements for this weekly drug journal will be received and forwarded through this office. Specimen copies and schedule of rates will be furnished upon application.

THE ERA BINDER.

The progress of the art of pharmacy is constantly modifying the value of the text books and reference works and this gives rise to the necessity for the drug journal whose purpose is to record all those acts, events and discussions which finally crystallize into the positive statements of the text books.

This recognition of the value of the drug journal suggests the idea that it should be regarded as a part of the pharmacist's working library, and further that it should be preserved in shape for frequent and handy reference. For the attainment of this object a suitable binder is a necessity.

The numbers of the Era contain much that every pharmacist should preserve. There are formulas, processes, discoveries and discussions which are of interest and of positive value if kept for convenient reference. A binder is furnished for 75 cents which holds the numbers of the Era (two volumes) for one year if the advertising pages are omitted, or the numbers for a half year (one volume) if the advertising pages are included. Sent post-paid on receipt of price.

Drug Prices in Papers.

A subscriber gives utterance to a complaint in these words:

"I notice some of the Pittsburg daily papers persist in printing a drug report quite frequently, and several of our customers seem to take a pride in referring to those reports, 'which of course are in the hands of the general public,' when making their purchases. I would like your opinion on this. What is the best way to meet the customer on his argument? It does not seem to me that the dailies were giving us a 'fair shake.'"

Of course you are not getting a fair shake, but who is responsible? Some druggist is, presumably a wholesale druggist. How would the papers get the prices if they were not told. But we must confess we cannot suggest a remedy, nor any means to prevent this publication. The daily paper of to-day aims to print everything, to supply every want, it gives prices on every line, druggists are not the only sufferers. This sort of thing is considered an evidence of hustle. The people have become educated in countless directions and the daily paper is one of the agencies, though only one, which have done it. The druggist himself tells much about the cost of his wares. He says in his advertisements that he has bought a barrel of epsom salts at the wholesale price of —cts. a pound, and will sell it at the slight advance of —cts. The price lists he receives from his jobber and the many manufacturers who supply him he leaves upon the counter and allows his customers to look through them while waiting for the filling of their prescriptions. His trade journals, with their market reports and prices current, are equally easily accessible, in fact, are often thrust upon his patrons' attention. So, it is not at all surprising to find customers who are well informed on prices. It is to be regretted that the papers publish these lists, and we heartily commiserate our subscriber who finds himself injured by the proceeding. But we can't help him.

Is the Apothecary Shop Doomed?

It is often wise, in discussing a question, to look at it from various points of view. For instance, the question propounded in the title above. This has been liberally discussed and written about by druggists, pharmaceutical associations, drug journals and so forth, but little opportunity has been given to the doctor to say his say. Here is what he thinks, voiced by an editorial in a recent number of the Journal of the American Medical Association:

Industrial evolution, as well as professional evolution, is constantly changing the relation of individuals to each other. The apothecary shop was originally the medicine room of the physician. Galen himself is supposed to have used the word, deriving it from the Greek apotheka, meaning a store or magazine. It was not until the time of Henry VIII. that apothecaries were recognized as distinct from the medical doctors. They were incorporated in 1606 together with the grocers, but later on had a separate organization, and since then have become more and more specialized. To-day another change seems to be taking place. The manufacturing pharmacist with his large factories and hundreds of workmen, is assuming here and there the duties of the dispensing apothecary.

On the one side the physician has his medicines ready made; his pills, tablets, coal-tar combinations, organic compounds, elixirs, etc., are used as they come from the

manufacturer. The apothecary dispenses them as the grocer sells baking powder and soap. No skill is necessary to fill a prescription for "Aunt Martha's Soothing Syrup" or "Roberts' Elixir of New Life." On the other hand, the science of therapeutics is becoming simplified; no twenty-ingredient mixture as in old times; not so much dosing; more expectant treatment; and the pill manufacturer is putting up cough syrups and lozenges and fever mixtures to please the taste of the most fastidious.

Where is the apothecary to go? Is he to become a vender of toilet articles and fancy crockery? Is he to be the commission agent for the pill manufacturer? Or is he to set up a medical advice counter and revert to the old surgeon-apothecary of the Middle Ages?

In the cities, many druggists stock medicine and advertise drugs for a nominal fee, and, on the other hand, many doctors buy a case of tablets and mixtures and dispense their own drugs. The manufacturing pharmacist in all probability is going to stay and to enlarge his domains. His agents will become more obtrusive, physicians' samples will be left in greater numbers, and he will have his retail agents on every corner. Perhaps this is not bad; it will insure greater uniformity in quality. The large manufacturer can afford to test all the drugs he purchases; he can command the best skill in manufacturing; he can obtain greater accuracy; his pharmacists are not bothered by retail customers, or talkative friends; they need not be overworked and underpaid.

The corner drug store with its boy and one clerk, and its thousand and one things requiring attention, its soda water counter, window cleaning, unpacking of goods, etc., is not in a position to fill prescriptions accurately. The large factory with its labor divisions is surely in a better position.

In the evolution of the trade, the manufacturing pharmacist must supplant the small drug store just as the department store supplants the small dry goods shop.

Even at present very few pharmacists do more than act as agents for the wholesale druggist. They buy their tinctures and extracts, pills and plasters already made. Their infusions are water-diluted extracts; their waters are mixtures of essences. They have not the time nor the means to make their own preparations, and the chances are that if they did they would make them from would be beneath the standard.

And then they must load their shelves with a dozen makes of pills, a hundred and more new remedies that the physician tries once and abandons. Surely the lot of the apothecary is not a happy one. Can the doctor do anything for him? We hardly think so. Economic reasons are at the bottom of it, and the doctor would go the way of the tailor, the shoemaker and the cigar-maker. His education must fit him for the laboratory of manufacturing apothecary and not for the corner drug store.

The Minority Speaks.

A wholesale drug house in the interior of Illinois has issued this manifesto, and retailers are receiving postal card copies thereof:

NO TRUST METHODS.

On the 14th inst., a meeting was held in Chicago, at which sixty-two wholesale drug houses from the Middle West were represented. At this meeting each of these sixty-two firms signed an agreement that they would give no rebates of any kind on patent medicines, and that they would not allow a greater cash discount than 1½ per cent. We are the only wholesale druggists in this territory who did not sign this agreement. We believe in absolute business independence, and do not subscribe to methods which have a suggestion of trusts. For this reason our patrons will continue to receive the benefit of our cash discount of 3 per cent., just double that which other firms have agreed to allow.

Tweddledum and Tweddledee.

The board of general appraisers has handed down an opinion in the case of fish livers that establishes a precedent in favor of American product as against the Canadian output. The case on which the decision was based was that of a couple of importers at Eastport, Me. They imported a lot of fish livers, and under the Dingley bill, which prescribes that intestines, integuments and sounds of fish are admitted free, claimed absolution from duty. The collector of the port assessed the livers three-quarters of a cent per pound, and the firm appealed. The board of appraisers upheld the collector, holding that fish livers do not come under the construction of intestines, integuments and sounds. This decision, it is stated, will be likely to raise the price of cod liver oil.

THE SAWYER MEDICINE CO.

The Dr. A. P. Sawyer Medicine Co., on a letterhead giving the address, 194-202 So. Clinton street, Chicago, writes us a long, closely typewritten letter of six pages, signed J. A. P. Sawyer, dated Dec. 28, setting forth that the Era's article of Nov. 25 did him much damage, and he wants the Era to take it all back, etc., etc. The letter is a wonderful specimen of fallacious and specious argument, special pleading and all that, and containing covert threats. We wish we had room to print it in full, but must content ourselves with a few extracts.

"You will concur with me that it is the duty of drug journals to defend the manufacturer as well as the druggist. It should be their duty to do the right and be ready to maintain it at all times so far as they take any part in the matter. Permit us to say that we thank you very much in publishing the article that you did for it was within your reach to obtain the plain facts, and were you now to allow one of your reporters to go with one of our men to any of the druggists in New York City, you would find that the complaint would vanish down to mere nothing. They simply complain because they have heard some other druggist complain and think thereby they may avoid paying the bill. Mr. Rockefeller was undoubtedly one of the most positive kickers, one of those who seemed to have the most complaints, and you can see his complaints amounted to nothing. Our attorneys and representatives inform us that you refused to make the article an editorial, and that is the reason that you saw an article in the Western Druggist headed, 'A New Dodge.' Now, there is not a single thing in the whole article that is true, and this is not a mere statement of ours, but we refer you to the editor of the Western Druggist. He has investigated the matter thoroughly at our office and is very much astonished and promises to gladly write us an editorial, giving the entire facts in the matter, which will appear in the next issue, the 15th of next month. * * * * *

"Our methods of advertising and selling druggists through salesmen is the same as all other proprietary medicine firms. * * * * * It is their policy to visit druggists but once a year and at that time sell them enough medicine to last until the next year. They do not find any drugs that have been previously sold and they have remained on their shelves a year and have not moved properly, they advertise more in some way. Now, this is precisely our plan. In your article you referred to the fact that the goods were unsalable. You cannot name any proprietary medicine firm in this country that sell medicine through traveling salesmen who visit their territory once a year, who move the goods off the shelves in a month or two. * * * * *

"Now, we have shown our disposition to do what is right, and more than we agreed to do by spending one-half of the money received from the accounts in New York City, providing all the accounts are paid. This offer we make collectively if the druggists will all pay, and pay promptly, one-half of the amount received will be spent in advertising. * * * * *

"Can you reconcile the matter and believe that it is right for a great number of druggists to buy goods, accept a large amount of advertising matter, newspaper advertising, samples, and advertising matter which we print especially for them, and then through conspiring together, reach a decision to refuse to accept of it, under the offer that we have made, we absolutely make nothing. We lose money by offering to spend 50 per cent. of the money received in advertising, as it costs us 25 per cent. to sell the goods, 30 per cent. to manufacture the medicine and furnish the advertising matter, and we have spent 15 per cent. for advertising already in newspapers; and now if we give them 25 per cent. for collecting and 50 per cent. for newspaper advertising, we have lost money. The only advantage that the business will be to us is future orders. * * * * *

"This difficulty in Ohio which the Western Druggist article refers to, was caused by a man whom we employed coming to us with good references and who proved to be very dishonest and we lost heavily from the complication he caused us. We asked all the druggists he sold to, to return the goods at once and released them from their contracts. Seven out of the fifteen druggists have not yet returned the goods. We told them that they must return the goods or pay for them. It seemed to be their policy to keep the goods and not pay for them. * * * * *

"You can now do us great good and partly undo the wrong you have done us by expressing to the druggists in New York that they ought to pay the bills promptly and that our offer to spend 50 per cent. of what we receive, in addition to what we have already done, is very generous on our part; and if these druggists do not pay us, are not they committing a great wrong? We wish

you would consider this matter in the proper light and not compel us to take any more positive method than we have already expressed to you. You cannot blame us for not only asking for our rights, but for demanding them. * * * * The druggists have a disposition to have their own way and not pay for goods, and are unusually spiteful and revengeful.

"What we want you to do is to undo fully the wrong you have done us, and to do that you must make a full retraction of the article so that the druggists that we have sold to will pay their bills, and so that we can sell to others. This, as we have said before, we have a right to not only ask for, but demand."

In reply to the suggestion that one of our reporters be allowed to go with a representative of the concern and interview the druggists, it may be said that this proposition was made by us to the attorney of the company, urged repeatedly upon him, and, though very reluctant, he finally accepted and made a definite appointment to be at this office at 10 a. m., on a certain date two weeks ago. He never showed up, nor has a word of explanation from him been received. There are other statements and allegations in the above quoted letter of this same character, false and misleading, and known to be such when written.

We have no quarrel with the Sawyer Medicine Co., but have thus far been successful, after careful and thorough investigation, in finding not one single instance in this city where its promises and representations have been kept to the letter. One of its agents admitted in this office, and seemed to glory in the fact, that it was the policy of the concern to load up the druggists; not caring whether the goods were ever disposed of by the retailer.

The Sawyer Medicine Company can square itself with those who claim to have been buncoed by it in only one way; by doing as its authorized agents agreed. This it has as yet shown no disposition to do. The druggists of New York City claim they purchased the goods on certain representations made by the agents, which representations have not been fulfilled. The Sawyer Medicine Company knows this, and its threats of suits and all that are very ill-advised. If it will keep faith with the druggists, and will get agents who are not falsifiers and hypnotizers, but who will do as they promise, it will very quickly find the druggists will return faith for faith, and pay their bills.

The methods thus far pursued by the concern are exceedingly well described by a correspondent in Ohio, whose letter is published on this page.

The Sawyer Medicine Company is welcome to this retraction. We shall be pleased to read what our Chicago contemporary can say to square the company with its customers in this vicinity.

Some time ago Drs. A., B., and C., who are connected with the city hospital at Pittsburg, Kan., and who are large practitioners of medicine, started a drug store. A bitter rivalry has been the result between the drug stores on that account, and last week the drug store owned by the company of doctors started cut-rate prices on all patent medicines. The other drug stores have met the cut prices and one druggist is advertising to fill all prescriptions written by Drs. A., B., and C., at 11 cents each, regardless of cost. "Brethren should dwell together in unity" doesn't seem to fit here.

A little boy about five years old, too tired for anything but sleep, refused one night to say his prayers. His uncle, who was present, said: "Oh, Harry, would you go to sleep without asking God to care for you during the night?" The little fellow answered: "I didn't say 'em last night; I ain't doin' to say 'em to-night, and I ain't doin' to say 'em to-morrow night, and then, if nothin' don't det me I ain't doing to say 'em no more."—Troy Times.

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

AN EXPERIENCE WITH THE SAWYER MEDICINE CO.

Cincinnati, Dec. 28, 1897.

To the Editor.

It is with much interest that I have read the article concerning the A. P. Sawyer Medicine Company in the number of Nov. 25 of your journal, and also the reply of Mr. Samuel H. Wandell, counsellor at law, in behalf of the company.

You might guess that I, like some others of the Cincinnati druggists, am one who has been there. Well, I am not at all ashamed of it; there is one thing sure, I am another experience richer.

Although I knew quite well what I signed, when I signed the contract between myself and the Sawyer Medicine Company, I thought they would carry out their part of the agreement, yes, and even considered their scheme of introducing their remedies a good one, especially as their agent assured me that the preparations were genuine and where once introduced a demand would be sure to follow.

The assurances, promises and guarantees of that glib-tongued agent of theirs were endless, and the fact that I was to be the only druggist in my territory who should be allowed to handle their remedies for at least a year, induced me to sign for a greater quantity than I would have otherwise ordered.

After having received the goods I found that my immediate neighbors were also well provided with Sawyer Remedies; however, I began to distribute the advertising matter very judiciously and had the satisfaction of selling more than a gross of the Family Cure Tablets at 5c, and a coupon. Meanwhile, my bill became due and I paid.

The Remedies were not advertised any further and the sale of Sawyer's Remedies stopped. It seems the Tablets cured the buyers to such an extent that they do not need any more, at least I have not sold a single bottle since, and am perfectly willing to sell their 25c, 50c., and \$1 preparation at 5c. a bottle without a coupon. After having the Family Cure on my shelf about three or four weeks one bottle after another exploded, fermentation being the cause. As I had still a little confidence in the honest efforts of the Sawyer Company, I wrote them about the matter, thinking they, as any respectable and honest house, would reply and remedy matters, but I am still waiting for a reply.

It is certain that no one can blame me if I doubt their assurance through their Mr. Wandell, and truly believe that the Sawyer Medicine Company aims to sell their remedies to the druggists only and not to the public. I am yours most respectfully,

JULIUS GREYER.

In heart-throbbing language an Ohio paper tells of enormous length of the death of one of the prominent citizens of the town from overindulgence in essence of peppermint. It says that in certain local opinion circles of the county whiskey has been banished. The taste still lingers, however, and demands a stimulating substitute, which has been found in essence of peppermint. We learn that the peppermint habit is dangerous, for the essence not only inebriates but kills, and already four leading citizens of the place have succumbed to it. Of the last victim we are touchingly and ungrammatically told that "he was not alone addicted to the use of peppermint, for he also imbibed hard cider, but the two in combination make a stimulating poison, nevertheless, and when indulged in more or less constantly, even for a short period, is certain to end in death."

THE PHENACETINE LITIGATIONS.

Since the entire drug trade is most interested in the numerous litigations brought by the owner of the American phenacetine patent, a review of the most recent developments in this matter will be so welcome. All the suits are brought on U. S. Patent No. 400,086, dated March 26, 1889, granted to Oscar Hinsberg and assigned and issued to E. N. Dickerson in New York City. In the specification of the patent, the process for making phenacetine, the chemical name of which is given as paracetamidophenetol, is described. The claim is for the product phenacetine itself. Beside this patent there exists a trade mark for the word phenacetine, No. D6392, March 19, 1889.

In the Eastern States the majority of the druggists sued for infringement of the patent, on account of having purchased phenacetine from dealers other than the licensed selling agent (Schieffelin & Co., of New York), compromised the matter by paying damages rather than defending the suits in the U. S. Circuit Courts. In the Western States matters shaped themselves somewhat differently. The first party who engaged counsel to defend the suit was Horace L. Roy, Kansas City. In this litigation a temporary injunction against selling illegitimate phenacetine was asked for and granted by Judge Phillips. Testimony on both sides was subsequently taken and in spite of a most active fight on the part of the defendant, Judge Phillips made this injunction permanent on final hearing of the case, signing the decree in the last part of November. This permanent injunction prevents the defendant from handling any other phenacetine than that sold under the label of Schieffelin & Co.

Within a few days after this decision the "Chicago Phenacetine Association," which had been formed for the collection of money to defend any suits brought against Chicago druggists by the owner of the phenacetine patent, was dissolved, for the reason that the question was too large to be solved by individuals.

Shortly after the Roy suit another suit was brought against Hugh L. Tilling, of Denver, Colo. Again a preliminary injunction was asked for, but Judge Hallett refused to grant it. In consequence of this seeming victory on the part of Tilling the "Denver Pharmaceutical Association" started a fund for the support of Tilling. Some of the most prominent druggists of Denver even traveled to Chicago and St. Louis to solicit contributions for this fund. The Denver druggists raised, we are informed, several thousand dollars and their able counsel argued not only both motions before His Honor Judge Hallett, but also went to Washington, and made a thorough search in the Patent Office records for defenses to the phenacetine patent. Subsequently, this counsel went to New York and attended at the taking of testimony, cross examining complainant's experts, and the other witnesses. When the appeal was argued at St. Paul, this same counsel appeared before the Appellate Court and argued the case for Tilling.

The complainant asked Judge Hallett for a rehearing in the matter of issuing a temporary injunction. The rehearing was granted and again Judge Hallett refused the injunction. Upon this second refusal the plaintiff appealed to the U. S. Circuit Court of Appeals in St. Paul. A hearing was held on the 4th of October, 1897, before Judges Sanborn, Thayer and Kier. A decision was handed down on Dec. 14, reversing the opinion of the lower court and directing the lower court to issue the temporary injunction. This decision is a very carefully prepared and complete document and is held to practically settle the question of handling phenacetine other than that sold under the label of Schieffelin & Co. Many druggists are under the impression that they can sell with impunity phenacetine which comes from Canada or from Germany through the custom houses instead of that which is sold by the licensee of the American owner of the patent. The above decision states that

such sales are infringements of the patent for phenacetine and make the druggist engaged in such trade liable for damages. Some of the most important parts of the decision are as follows.

After reciting the facts in the case, the court says: "Even if it were conceded that Bayer & Co. and not E. N. Dickerson were the real owners of the letters patent in suit as alleged in the answer, it would be difficult upon the facts disclosed by this record to justify a sale of phenacetine in the United States by this appellee (Tilling)." . . . "The answer avers that the appellee (Tilling) bought the phenacetine he is selling in a foreign country either from Bayer & Co. or from others who had a legal right to sell it in that country. He must have bought it therefore, of Bayer & Co. or their vendees, or of others, if he bought of others than Bayer & Co. or their vendees, he bought with it no right to sell it in the United States, because no one but Bayer & Co. and their vendees had that right in this country. The right to sell the patented article in the United States is not governed by the laws of Germany or of England, but by the laws of this nation, and under those laws the patent of the United States, No. 400,086, has the exclusive right to make, use, and vend phenacetine in the United States." . . . "The cases of *Adams vs. Burke*, 17 Wall. 453, 456; *Hobbs vs. Jonson*, 149 U. S. 355, 362, and *Keeler vs. Standard Folding Bed Co.*, 157 U. S. 639, 664, in which it was held that one who purchases patented articles of a territorial assignee within the district of the United States, assigned to him, may sell them again in the territory owned by another, do not rule the case in hand. They rest upon the principle that one who buys the patented article of a party, who is legally empowered to sell it under the patent, has once paid tribute to the monopoly and has thereby acquired the right to use and sell the article he buys elsewhere within the United States. But one who purchases in a foreign country of others than the owners of the U. S. patent or their vendees pays nothing either directly or indirectly to the owners of the patent and therefore he acquires no right to make, use, or vend the article which he buys within the territorial limits of their monopoly. It follows that if the appellee (Tilling) bought the phenacetine he is selling of others than Bayer & Co. or their vendees, he is infringing upon the exclusive right of this patentee and an injunction should issue."

"Bayer & Co. had the right to sell its phenacetine in Germany without restriction; it had an equal right to sell it subject to the limitation that it should not be sold or used in this country without the express consent of the corporation which that corporation held under this patent to make, use and vend the phenacetine in the United States. If the corporation sold the patented article subject to such a restriction the purchasers with notice of this limitation, whether immediate or remote, could acquire no better right than strangers to infringe upon the monopoly secured by the patent. That monopoly would still remain intact and purchasers of the phenacetine which had been sold under the restriction must be liable for its use and sale in the United States to the same extent as those who made or bought it of strangers within their limits."

"The record is that every package of this article sold by Bayer & Co. in a foreign country was sold on the express condition that it should not be imported into, or sold within the United States and that this prohibition was plainly printed upon every package. The necessary result is that whether the appellee (Tilling) bought in a foreign country the phenacetine which he is now selling in the State of Colorado from Bayer & Co. or its vendees, subject to this restriction, or from others without restriction, he is alike an infringer upon the exclusive right to make, use and vend the phenacetine within the United States which was granted to this corporation by the letters patent."

The latest injunction obtained by Mr. Dickerson was one in Providence against Druggist R. A. Payne, who had purchased about 5,000 ounces of Bayer's drugs at an auction sale of goods seized by the U. S. Government. At the sale, the United States Marshal read what was on the boxes, to those attending the sale, and among other things he read: "Patented in the United States of America. Patent No. 400,086. The resale and importation are prohibited in the United States of America."

The attorney for the owner of the patent was present, and called attention to the fact that letters patent had been issued for phenacetine, and that if any one bought phenacetine at that sale, the purchase would constitute an infringement of the patent. Notwithstanding this in-

formation and notice Mr. Payne, a partner in the firm of S. J. Briggs & Co., purchased the phenacetine and sulfonal.

Thereupon a bill of complaint was filed against Mr. Payne, and on the 20th of December, Judge Brown granted an order restraining the defendant from using or selling in any manner, directly or indirectly, phenacetine in infringement of the letters patent aforesaid, and at the same time gave order to show cause why a preliminary injunction should not be granted. On Monday, Dec. 27, 1897, the matter was argued by counsel for Mr. Dickerson and for Mr. Payne, and it resulted in the restraining order granted by Judge Brown being kept in force, and further, in the judge granting an order restraining Payne from shipping or disposing of the phenacetine. This last named order prevents him from sending it out of the country. One of the powers of the Circuit Court and one, which under proper circumstances has been frequently exercised, is to order the infringing device to be delivered up to the complainant for destruction; and it was for this reason that the court would not allow the phenacetine to be removed.

The court puts Mr. Payne into a very difficult position. Although he bought the goods at a government sale he cannot dispose of them nor can he export them, moreover he is liable for any damages suffered by the owner of the patent. Druggists when they have been offered phenacetine by parties, usually itinerant vendors, have been told the story: "The government has received the duty and has allowed it to come in, and therefore you have a perfect right to use it."

The case of Payne demonstrates that this is not so. Customs officials have nothing to do with regard to anything offered to be brought into this country except to see that duty, if there is any, is collected on the article offered.

The above decision by the United States Circuit Court of Appeals at St. Paul can only be reversed by the Supreme Court of the United States. The only way that the case could get up there would be if the Supreme Court of the United States should ask for it by a proceeding called *certiorari*. We mention this, so that it may be thoroughly understood that this decision is by a court of last resort, and is considered to definitely, clearly and concisely express the law applicable to this class of cases, namely that the restriction "not to be sold or imported to the United States of America," if violated, will cause the party violating it to be treated as an infringer.

We understand that the phenacetine patent has simply been made a vehicle for a test case, and that druggists who have been purchasing sulfonal, aristol, trional, salol, antipyrine and other patented remedies, are liable to separate suits, and to pay damages and costs, in each such separate suit, where they have purchased from others than those licensed to sell these patented goods. Some of these patents are owned by Mr. Dickerson, and some by other people, and druggists who have purchased from itinerant vendors, whose names and addresses they do not know, now have nobody to fall back on when they are sued. If a druggist purchases from a responsible jobber, goods which infringe a patent, he can call on this jobber to defend him, and if the jobber does not do so, can collect from him any damages or expenses to which he has been put by reason of the sale of articles infringing the patent; but if a druggist buys from a tramp he rests upon his own responsibility.

TO CLARIFY WINE OF PEPSIN, it is recommended to shake it with 3 to 5 Gm. of milk per liter. After standing a few days it is ready to filter. This method of clarifying may be applied to all kinds of medicinal wines. (Ph. Ztg.)

SOME ANIMAL SUBSTANCES USED AS REMEDIAL AGENTS A CENTURY OR MORE AGO.

HUMAN SKULL, *Cranium hominis*. The powder, in doses of one dram, used in epilepsy; those a long time buried said to have been preferred and some even limited the remedial action to the *ostriquetrum* (bone of the corpus, situated between the os lunare and os orbiculare).

PARING OF THE NAILS, *Rasura ungulis*. A common emetic.

MUMMY, *Mumia*. Either that brought from Egypt, or prepared by dipping muscular flesh in spirit of wine and hanging it up in a brisk draft of air, or smoking it like ham. Used in bruises, epilepsy, asthma, phthisis, in powder $\frac{1}{2}$ to 1 dram. Classified by one writer (1753) as a vulnerary.

PUPPIES, *Catelli*. Live puppies, split in half and applied while warm; employed as poultices "to draw venom" from sores or boils. The puppies were sometimes boiled first in oil to make the poultice "mucilaginous."

WOLF'S LIVER, *Hepar lupi*. Used dried in diseases of the liver.

FOX LUNGS, *Pulmones vulpis*. Used when dried and powdered in a pectoral linctus. This remedy was a great favorite among the common people. One writer says that the lungs of a fox must be a specific for asthma because "that animal is remarkable for its strong powers of respiration."

HUCKLE BONE OF THE HARE, *Astragalus leporis*, *Talus leporinus*. Diuretic powder.

HARE'S FUR, *Pili leporis*, *Styptic*.

MUSK, *Moschus*. Antispasmodic and diaphoretic. The author of the New Dispensary (1753) quaintly remarks that in his day "it has been for some time out of use, even as a perfume, on a supposition of its occasioning vapours, etc., in weak females and persons of sedentary habits."

ELK'S HOOF, *Ungula alcis*. Anti-epileptic, either worn externally, so as to touch the skin, or taken in powder in doses of one dram. Said to "smell very sweet, by which it may be distinguished from a buffalo's hoof, which is sometimes sold for it."

BONE OF A STAG'S HEART, *Os e corde cervi*. Cardiac, esteemed to remove barrenness and prevent abortion. Dose, in powder, one dram.

HARTSHORN SHAVINGS, *Rasura cornu cervi*. The horns of the buck or fallow deer. To quote the New Dispensary (1753), "Many extraordinary virtues have been attributed to these horns, and to all the parts of the animal in general; but experience gives no countenance to them; nor do they seem to have any other foundation than the great timidity of the hart, the annual removal of his horns, and an opinion of his extraordinary longevity: from these circumstances it was inferred that all parts of him must be proper for intimidating the enraged arcturus, renewing health and strength, and prolonging life."

BOAR'S TOOTH, *Dens apri*. Used as hartshorn shavings, but of greater value.

RHINOCEROS HORN, *Cornu rhinocerotis*. Alexiterial, in powder; dose one dram.

UNICORN'S HORN, *Cornu unicornu*. Resists the operations of poisons.

INWARD SKIN OF THE FOWL'S GIZZARD, *Pellicula stomachi gallinae interiores*. "To strengthen the stomach."

EGG SHELL, *Caro testudinis*. "Highly nutritive, analeptic and antiscorbutic." (Gray.)

SKINKS, *Scinci*. Dried, salted and powdered skins were considered alexipharmic, aphrodisiac and diuretic. Were also used in the preparation of the "mithridate."

SCALY LIZARD, *Lacerta agilis*. Was sometimes used instead of skinks.

VIPERS, *Viperæ*. Both live and dried; were official in the Edinburgh Pharmacopœia and considered "alexiterial, sudorific, depurative and very nutritive." An old

work on *materia medica* discusses the subject in part as follows: "The viper or adder is one of the viviparous reptiles, without feet, about an inch in thickness, and twenty or thirty in length. The poison of this serpent is confined to its mouth, at the basis of the phanges, or long teeth which it wounds with, is lodged a little bag containing the poisonous liquid, a very minute portion of which, mixed immediately with the blood, proves fatal; our viper-catchers are said to prevent the mischiefs otherwise following from the bites, by rubbing olive oil warm on the part. The flesh of the viper is perfectly innocent and strongly recommended as a medicine of extraordinary service in scrophulous, leprosy, and other obstinate chronic disorders; its virtues, however, in these cases, are probably too much exaggerated. The viper is undoubtedly an high nutritious food, and hence, in some kinds of weaknesses and emaciated habits, is not undeservedly looked upon as a good restorative. To answer any valuable purposes, fresh, vigorous vipers (not such as have been long kept alive after they are caught) should be liberally used as food; the wines and tinctures of them can scarce be supposed to receive any considerable virtue from the animal (?); the dry flesh brought from abroad is entirely insignificant."

TOAD, Bufo. The toad "dried by a gentle heat and pulverized" was greatly esteemed as a diuretic and antihydrotic. Dose in powder, to one dram. Applied externally to the abdomen to restrain "haemorrhages." "Bufo Præparatus" or "prepared toad," was officially manufactured by the old Edinburgh Pharmacopœia as follows: "Put live toads into an earthen pot, and dry them in an oven moderately heated, till they become pulverable."

PREPARED GOAT'S BLOOD. *Sanguis hirci præparatus* (Edinburgh Pharmacopœia). "About the beginning of summer, take blood from any convenient artery of a middle-aged goat, and expose it, in a clear vessel, to the sun, or a moderately heated oven, till sufficiently dried." Paris, the author of "Pharmacologia" and professor of *materia medica* in the Royal College of Physicians, London (1819-21), quoting from Browne's "Vulgar Errors," states that in many of the ancient works on physic, the blood of the goat was extolled for its efficacy in dissolving stones, and from this supposed lithontriptic virtue, it forms the principal ingredient of the "Powder of Nicotiana" and of the "Electuary of the Queen of Colein." The expression which gave origin to this belief was evidently allegorical, signifying that the blood of the goat, by which our Savior was typified, was capable of softening the stony hearts of his enemies, or according to others, that by his influence the stony rocks and veil of the temple were shattered.

FROG'S SPAWN, Spertiola, Ranarum sperma. "Celebrated as an excellent cooler for external purposes"; also used as an ingredient of a distilled "simple water."

SALAMANDER, Salamandra. Prepared by infusion in oil. Used by internal administration as a diaphoretic; externally, useful in rheumatism.

BONE OF THE PERCH'S HEAD, Os e capite percæ. Absorbent, lithontriptic; externally in tooth powders and to dry ulcers.

PIKE'S JAW BONE, Mandibula lucii. In powder; useful in leucorrhœa and to facilitate labor; dose, 1 to 2 drams.

LIVER OF EELS, Hepar anguillæ. Used dried and powdered, to facilitate labor; dose, one to two scruples.

HOG LICE, WOOD LICE, Millepedes, etc. Alive, No. 12 (Gray) or dried and powdered, in dose of one to three scruples; used as a diuretic, "aperitive," and in the treatment of jaundice. Millepedes were official in the early editions of both the London and Edinburgh Pharmacopœias.

The insect kingdom was also called upon to furnish scorpions, beetles, bedbugs, ants, bees and a number of other substances, like cantharides, cochineal, etc., used more or less at the present time.

THE MICROBE OF YELLOW FEVER.*

I owe the chance of the discovery of the microbe of yellow fever to the second case of the disease which presented itself to me at the island of Flores. This case, though it showed a mixture of various microbes, had, in a state of relative purity, the specific microbe, to which I have given provisionally the name of "bacillus iteroides," because yellow fever is known also under the name of typhus iteroides. I have said, "in a state of relative purity," because yellow fever is the prototype of the diseases of mixed infection. I have never found the "bacillus iteroides" alone in the autopsies I have made. It has been associated always with the micro-organisms previously referred to or among the numerous species of common microbes, or it has been impossible to find it because the other microbes, having entered the organism in its train, have ended by impeding its evolution and have even caused it to disappear entirely. The "bacillus iteroides" must be sought for in the blood and in the tissues, and not in the gastro-intestinal tube, in which, contrary to what might have been supposed a priori, I have never encountered it.

Upon the result of my investigations I will say that the isolation of the specific microbe of yellow fever is possible in only fifty-eight per cent. of the cases. The reasons for this are easy to understand. Before all, in the beginning of the disease, the "bacillus iteroides" multiplies very little in the human organism, a very small quantity of its toxin being sufficient to provoke in man the worst type of the disease. In the second place, the toxin, whether by itself or indirectly through the profound lesions it causes, especially in the digestive mucous membrane and in the liver, facilitates in an extraordinary manner every sort of secondary infection. According to my investigations, the "bacillus iteroides" is found in the circulating blood and in the tissues; the germ of yellow fever does not reside in the digestive tube, and its poison, instead of being absorbed through the intestinal walls, is fabricated in the interior of the organs and in the blood.

Morphologically this bacillus does not present at first sight anything characteristic. It is a little rod, with rounded extremities, united at best by pairs of cultures and in groups in the tissues, from two to four micromillimeters in length, and generally two or three times longer than it is broad. It is sufficiently polymorphous. Even in the cases that give the best results from the bacteriological examination, it is not easy to place the bacillus in evidence in sections of the tissues, on account of its extremely small number. In spite of this, by using the utmost care, one can find it in the organs, united usually in small groups and situated always in the minute capillaries of the liver, the kidneys, etc. Different modes of evolution can be used for diagnosis by exposing cultures, first for from twelve to sixteen hours to the temperature of the air. This done, the colonies show themselves to be constructed with a flat central nucleus, transparent and azure, having a peripheral circle prominent and opaque. This peculiarity, which may be considered specific, may be made evident in less than twenty-four hours, serving to establish the bacteriological diagnosis of the "bacillus iteroides." Apart from this morphological characteristic, which suffices of itself to differentiate the microbe of yellow fever from all others previously known, the "bacillus iteroides" is endowed with some interesting biological qualities.

Once isolated, the exact bacteriological diagnosis of the bacilli does not require more than twenty-four hours. The disease is transmitted experimentally even by the respiratory tract to rabbits and guinea pigs; the bacteriological examination of these cases shows, at least, the existence of a toxic process identical with that which

*From an address delivered by Giuseppe Sanarelli, M.D., at Montevideo, June 10, 1897, printed in the Medical Record, New York. Translated by A. C. H. Russell.

takes place in man. It is then possible that the contagion of the virus of yellow fever may be effected even by means of the air, which is in accord with the dominant opinions in this respect. Up to the present time almost every sort of means has been tried in order to transmit yellow fever experimentally. These attempts gave no results, which explains why for many years the conviction has prevailed in the United States that this terrible malady was not contagious.

My experiments upon man reach the number of five. For reasons easily understood I have not used living cultures, but simple cultures in broth from fifteen to twenty days old, filtered with the Chamberland filter and sterilized, moreover, with the greatest caution by a few drops of formic aldehyde. In two of the individuals I tried the effect of subcutaneous injections and in the other three that of intravenous injections. These fortunate experiments, though few in number, are sufficient to illuminate in a manner unhopd for all the pathogenic mechanism, so obscure and so badly interpreted until now, of yellow fever. The injection of the filtered culture in doses relatively small reproduces in man typical yellow fever. The fever, the congestions, the hemorrhages, the vomit, the fatty degeneration of the liver, the headache, the backache, the nephritis, the anuria, the uremia, the jaundice, the delirium, the collapse, in fine, all that conjunction of anatomical and symptomatic elements which constitute by their combination the indivisible basis of the diagnosis of yellow fever, I have seen unroll before my eyes, thanks to the potent influence of the yellow fever poison made in my artificial cultures. This fact not only represents very valuable evidence in favor of the specific nature of the "bacillus icteroides," but it establishes new grounds for the etiological and pathological conception of yellow fever.

For the rest, the tenacious resistance to desiccation and to water I have found in the "bacillus icteroides" authorize me to admit that the diffusion of the virus of yellow fever can take place as well by air as by water. The experiments on animals show that infection by the respiratory tract is possible. With respect to the mechanism of infection by the way of fluids, a fact beyond doubt is that when the epithelium of the digestive tract is intact, in general it does not permit the entrance of any sort of pathogenic germ.

For a year, by work often interrupted, I have had the fortune to bring to this point our knowledge of this terrible infirmity, which represents the most grave and urgent sanitary problem throughout America. The ground covered is without doubt wide, but there remains yet much to go over. We have learned to know the specific agent of yellow fever; we have it in our power; we have studied minutely its life, its habits, its wants, its relations to external agents and to other small organisms; we have revealed the complicated mechanism of the infinite manifestations which this agent determines in the human organism, and we have finally placed this disease, which a few months ago was a horrible mystery, on the same level as that occupied by the other great infectious diseases.

Poets are proverbially sensitive. Perhaps because we are poets is the reason we are sensitive. A few months ago we completed a brief editorial on the early-closing question by a few lines of original (very original) doggerel fashioned after Hamlet's famous "to be or not to be" soliloquy. And now it comes back to us, printed in the *Pharmaceutical Digest* and credited to M. M. J., whoever or whatever that may be. The only alteration is that it is now a little disfigured by bad spelling, such as "sickled" for "sicklied," and "loose" for "lose." But we could have suffered patiently under all this; the straw which breaks the camel's back is that the stolen poetry (?) is printed by our contemporary under the caption "Shakespeare on Early Closing." Why heap such indignity upon the immortal bard? We are mortal, credit it to us.

MANUFACTURE AND PROPERTIES OF CARBORUNDUM

Chas. A. Kohn, president of the Liverpool Section of the Society of Chemical Industry, presented at a recent meeting of that section a most interesting address upon the subject indicated in the caption. From this address, published in full in the journal of the Society, the following portions are taken as of most interest to readers of this paper:

The experiments which led to the discovery of carborundum were undertaken by Acheson, in March, 1891. With the hope of obtaining carbon in a crystalline form, an electric current was passed through a mixture of carbon and clay, placed in a carbon-lined iron bowl, the idea being that the clay, or the aluminum reduced from it, would dissolve the carbon and deposit it in crystals on cooling. The current employed was sufficient to fuse the mixture; a violent reaction took place, and a few hard crystals—not diamonds—were separated from the mass after cooling. A larger furnace made of refractory bricks was next tried, into opposite ends of which adjustable carbon rods were inserted as electrodes, and an alternating current of 100 to 200 amperes with an adjustable potential of 1 to 50 volts used. The crystals obtained were exceedingly brittle, but sufficiently hard when ground to a fine powder to abrade the diamond; from their color and general properties, as well as from the materials used in their manufacture, they were regarded as composed of carbon and alumina (corundum) and named "Carborundum." This was in 1892, and before the product had been analyzed. In the same year Schützenberger prepared amorphous silicon carbide by strongly heating a mixture of carbon and silica in a bone-black crucible, and showed that the green amorphous product formed had the formula SiC. The temperature of the furnace was evidently insufficient to allow of the formation of the crystalline carbide.

Acheson's early experiments soon led him to recognize the fact that the silica present in the furnace played an important part in the production of the carborundum, and direct experiment, in which the alumina was entirely omitted, confirmed this. A mixture of equal proportions of carbon and sand, to which 20 per cent. of salt on the total mixture was added, was found to give a largely increased yield of carborundum. The salt was added to facilitate the fusion of the mass. The furnace employed was considerably modified, especially with the view of overcoming the serious difficulty of starting the fusion of the mixture and of avoiding the continual changes in its internal resistance. These two objectionable factors were simultaneously eliminated by building a solid core of carbon between the two electrodes along the length of the furnace, and thus dividing the single arc previously used in a very large number of arcs of varying size and intensity, at the same time providing a conductor for the current. It is this arrangement that forms the essential feature of the furnace now in use; it allows of the easy regulation of the current, and entirely avoids any possible electrolysis of the mixture.

For the preparation of carborundum on a large scale the materials consist of coke, silica, salt, and sawdust. The coke is the ordinary bee-hive oven product; the other ingredients call for no special comment. The salt acts partially as a flux, and also helps in the separation of the crusts of the different products that results in the manufacture. A considerable portion is volatilized. An addition of sawdust has been found advantageous, since the gases evolved during its carbonization leave a porous coke, which serves to some extent as an exit for the carbon monoxide evolved. Formerly sudden evolutions of gas occurred, forming "blow holes" some distance below the surface of the mixture in the furnace, and often necessitating the removal of the overlying material; this is overcome by the addition of the sawdust.

The coke (thoroughly ground and sifted), sand, salt

and sawdust, after being weighed out, are thoroughly mixed in a mechanical mixer. The following are the proportions used: Coke, 34.2; sand, 54.2; sawdust, 9.9; salt, 1.7.

The sides of the furnace are built up as it is filled, and subsequently pulled down to allow of the removal of the carborundum, so that only the beds and ends are permanent. This has been found advantageous, owing to the walls becoming incrustated and consequently to some extent conducting, when used repeatedly, thereby causing a decreased yield of carborundum. The furnaces, of fire brick, are 16 feet long, 5 feet wide and about 5 feet high. The ends are very solidly built, and about 2 feet in thickness. In the center of either end are the terminals, which convey the current through the central core of the mixture. These consist of 60 carbon rods, 30 inches long and 3 inches diameter, into the outer ends of which small pieces of $\frac{3}{8}$ -inch copper rod are fixed. A square copper plate, bored with 60 holes to receive the copper rods connected with the carbon electrodes, holds these latter in position. The carbons are placed in position from the inside of the furnace, starting with the bottom row, the spaces between the rods being packed tight with graphite as the fixing proceeds. The graphite packing prevents the oxidation of the carbons, and thus adds very materially to their durability. Each copper plate is provided with four projecting rods, to which the cables carrying the current are bolted.

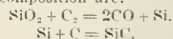
Three rows of brick are left permanently along the sides of the furnace, the remainder being built up as stated. At first the bricks are carried to a height of about 4 feet. Before putting in the mixture, iron screens are put around the inner ends of the furnace, about 4 inches away from the carbon terminals, so as to keep the mixture from coming in contact with the latter. The mixture is then thrown into the furnace until it is rather more than half full, when a semi-circular about 10½ inches radius is made along the length of the furnace from end to end. Into this the weighed "core" is placed, a mixture of old and new core being generally used. The bottom of the trench reaches a little above the bottom row of carbons. The core is built up so as to complete the circle, forming thus a solid coke cylinder the length of the furnace and 21 inches in diameter. To connect the core with the terminals, finely ground coke is packed into the space between the carbons and the iron screens; next, the sides of the furnace are built up to the full 5 feet, the screens removed, and, finally, more mixture thrown in and heaped up to a height of about 8 feet. The furnace is then ready for use.

The works under description are those which receive their supply of electrical energy from Niagara Falls, through the Niagara Power Co., and the current has an electromotive force of 2,200 volts. By means of transformers, regulators, etc., the current is reduced to 165 volts which can be raised to 220 or lowered to 85, and transmits an alternating current to the furnace. The charge of new mixture to the furnace is about 30,000 pounds; a considerable quantity of old mixture is also always used over again—sufficient to fill up the furnace. The core forms about 3 per cent. of the total charge; a mixture of old and new core is employed, the latter being added on account of its better conductivity.

After the cables have been bolted on to the plates of the furnace, the current is completed through the rheostat in the transformer room, and the readings of the voltmeter and ammeter watched carefully. A pressure of about 190 volts is required in the start, but as the coke gets warm the resistance decreases, and within an hour to an hour and a half becomes practically constant. As the current increases the regulator is run back, reducing the electromotive force, which is kept at about 125 volts till the end of the run. Very little regulating is subsequently required, but a very gradual decrease in resistance appears to be continuous, and is due to the for-

mation of a layer of graphite immediately round the core, thus increasing the diameter and conductivity of the latter. This formation of graphite is regarded as due to the decomposition of silicon carbide after formation by the intense heat in this portion of the furnace.

No immediate change is apparent on starting the furnace, but within half an hour the decomposition of the sawdust in the mixture is rendered evident by the smell. Carbon monoxide is gradually evolved, and after 3 or 4 hours it comes off in sufficient quantity to be lighted, when the sides and top of the furnace become enveloped in the flames. No less than six tons of this gas are given off during the run of a furnace. The equations representing the decomposition are:



After 5 to 6 hours from the start, the progress of the working of the furnace is indicated by the appearance of the yellow sodium flames; fissures begin to form in the mass, and the upper portion sinks down as much as 3 inches. This decrease in bulk continues till the end of the run, but more mixture is thrown on as it proceeds, so that by the end of the run it reaches up to the top of the side walls of the furnace. From $\frac{1}{2}$ to 1 ton extra mixture is thus added. After 36 hours the heating is finished. The current is then broken and the furnace allowed to cool for 24 hours. The length of run is considerably longer now than formerly; both the energy expended and the rate of production are favored by this change.

After the furnace has cooled, the side walls are partially pulled down and the loose unchanged mixture on top of the furnace raked off. This is used over again. Below this is a well-defined layer of amorphous carbide of silicon, with which varying quantities of unchanged mixture are mingled. The portions of this crust nearest the core are of a greenish tinge, due to the contained iron. On the outer portions of the crust the volatilized salt can always be seen. The amorphous carbide forms a readily friable mass of a dirty gray color, and is easily removed, being first cut through with iron bars and then shoveled out. As yet, this product is entirely valueless, very unfortunately so, as it forms over 40 per cent. of the total carbide produced. Its amorphous nature is due to the relatively lower temperature of this portion of the furnace, and it is the sole product obtained when the furnace is only run for a short time. It has not been found possible to convert it into the crystalline variety. The change from the amorphous carbide to the carborundum is well marked, the latter forming a layer from 10 to 12 inches thick around the core.

The outside of this crust of carborundum is first scraped clean with spades, then loosened with bars, and the carborundum dug out. The appearance of the mass when this crust is opened is exceptionally striking, the whole forming a glittering mass of brilliant crystals measuring up to half an inch in diameter and all beautifully iridescent. The color varies from a steel-gray to a brown-green, and many of the crystals are quite transparent. The carborundum is subsequently prepared for use by grinding it, washing with dilute acid, and sorting into different grades of fineness.

The practical value of carborundum is essentially as an abrasive, either in the form of powder or as wheels. For the latter the carbide is mixed in suitable proportions with clay and felspar, the mixture moistened, pressed into molds, and then dried in kilns. Wheels from 36 inches diameter down to the small dental wheels are thus prepared, various grades of carborundum being chosen according to the requirements of the work. For fine hones, rub-stones and the like, other binding material is employed, whilst papers are prepared similarly to emery paper.

In these various forms carborundum is employed in the iron and steel industries, in the manufacture of pottery

and porcelain for smoothing up the "biscuit ware," and for polishing granite. It is stated to be especially good for brass valve grinding, and is extensively used in the form of paper in the United States by shoe manufacturers for finishing the soles of shoes. The experiments in polishing plate glass have not been entirely successful, as, owing to its extreme hardness the glass is scratched, but it is reported that a new method for polishing plate glass allows of its advantageous use. A very interesting application is the use of barrel-shaped wheels for finishing hides and putting on the "nap."

In all these applications carborundum has to compete with emery, and for it to replace the latter its higher price—it is from two to five times as dear—necessitates very marked advantages. These advantages appear to be twofold. On the one hand it can work more quickly, and on the other it can do more work. Carborundum can do twice the amount of work of emery with a saving of 25 per cent. of the labor, and in addition, in many instances, the work done is better.

Our knowledge of the carbides of the metals is still in its infancy, but there is hardly an instance in which a laboratory curiosity has risen so rapidly to an important product of manufacture as has been the case with carborundum. Carbide of silicon is but six years old. During this period its price has steadily decreased from ten dollars a pound in 1892 to about 15 cents at this writing. The production during 1893 was 15,200 pounds; during the first half of 1897 it was 741,297.

CONCERNING PUMICE STONE.

An interesting report on the pumice stone industry in the Lipari Islands has been furnished to the British Foreign Office by Mr. Norman Douglas. Pumice occurs on most shores of the Tyrrhenian Sea and elsewhere, but that of commerce is at present almost exclusively obtained from the island of Lipari. It is a trachytic lava, rendered light and scoriaceous by the escape of gases, and every gradation can be traced, from this condition to the heavy vitreous matter of similar composition known as obsidian. Good pumice contains: Silica, 73.70 per cent.; alumina, 12.27 per cent.; potash, 4.73 per cent.; soda, 4.52 per cent.; oxide of iron, 2.31 per cent.; water, lime, etc., 2.47 per cent.

Most of the volcanoes of Lipari have ejected pumaceous rocks at some period or other, but the best stone is the product of Monte Chirica, with its accessory craters, Monte Pelato and Forgia Vecchia. The district containing the deposit lies in the northeast of the island, and covers an area of about three square miles. The mineral is excavated in various parts of it; in the plateau of Castagna, on the sides of Monte Chirica and Monte Pelato, at Perea, near the seashore of Acqua Calda, and at one or two isolated points. To this end tunnels or galleries are dug into the layers of denuded lapilli and ashes that have gradually covered the pumice. The mineral is sometimes found near the surface, at other times under a layer of white tufa. Digging is not difficult. The tunnels are lighted at intervals by small terra cotta lamps of antique form, and are so narrow that two men can barely pass. The deficiency of air is soon felt. Sometimes, when a stratum of pumice has been reached, cross cuts are run to gain a larger supply of pumice out of the soft material in which it lies embedded. It is often a matter of speculation how soon pumice will be reached, so that many tunnels are abandoned, while others are worked for long periods. The output may be large one day and almost exhausted the next, or the quality of the stone may change. It has been observed that certain localities produce certain qualities; thus, some of the best pumice comes from Acqua Calda and Monte Pelato, while the inferior variety, known as "alessandrina," is found at Castagna. The number of tunnels actually in working has been estimated at 250, but they vary greatly in size. The number of workmen also fluctuates accord-

ing to their personal requirements and the season of the year, but has been estimated at about 1,000, of whom 600 are miners.

Pumice is brought to the surface in large blocks or in baskets, and is carried to the village of Canneto by land or to the seashore, to be taken there in boats. About one-fourth subsequently reaches Lipari by sea. It is there generally stored in the sheds of the merchants, and unless they are in a hurry to dispose of their stock, it is allowed a month to get thoroughly dry. This reduces the weight and shows the quality. After that, large blocks weighing 15 pounds and upward are allowed to crumble according to their cleavage into so-called "lisconi," and all the pumice is then assorted according to its size into (1) large ("grosse," lumps down to the size of a fist); (2) medium ("correnti"); and (3) small ("pezzame," from 2 inches downward). The quality is primarily a matter of texture. As pumice is used for polishing purposes, an essential condition is homogeneity of structure and freedom from included crystals. The stone must be neither too brittle nor too hard, and it is in these respects that the Lipari pumice surpasses that of other volcanic regions. After it has been divided according to its size, the large stones ("grosse") are again sorted into three superior qualities called "fiore," "quasi fiore" and "mordente." These are never filed.

After they have been selected, the remainder of the "grosse" are filed by hand, in order to remove asperities of surface and to see whether the stone is not too friable for use. They are then reclassified into first, second and third ("bianche," "dubiose" and "nere"). Large pieces of inferior pumice, known as "rotonde," are never trimmed. Besides this, there is an entirely different variety called "alessandrina," which is cut with hatchets into brick-shaped pieces and used for smoothing oil-cloth, and a heavy dark stone, "bastardon" (always trimmed), as well as many less important varieties. The "correnti," commercially termed "sorts," contain all varieties, and are generally exported as they are; the "pezzame" is usually, but not always, ground to a powder of more than ten different degrees of fineness, according to the work for which it is required.

So extensive are the deposits that the supply is practically inexhaustible. The pumice washed up by the sea is hardly ever collected nowadays. The number of tunnels could be increased indefinitely, and if they were worked on a larger and more systematic scale, the output would probably be trebled. Thus the superior material which is now obtained, not without danger to life, by running tunnels into the precipitous internal crater wall of Monte Pelato, could be reached by longer tunneling from the outside, where there are only a few caves at present. The only menace to the pumice industry lies in the introduction of artificial polishing materials.—(Sci. Am. Supplement.)

The quicksilver industry of the United States is practically confined to California, but it is gradually extending into Oregon. Deposits have recently been found in Texas, but they have not been developed.

In 1891, 924,000 pounds of amalgam were produced in the United States with a total value of \$464,000. In 1896, 1,300,000 pounds were produced, but with more efficient work in producing and less expense for power the value of the total output amounted to but \$520,000.

In 1896 the production of mineral waters in the United States aggregated 25,795,312 gallons, a slight increase over the figure for 1895 which was 24,463,543 gallons. A general decline in prices was evident in a decline of the total value from \$4,254,237 in 1895 to \$4,136,192 in 1896.

The Fuller's earth industry of the United States is practically limited to Quincy, Florida, though extensive beds have been found in other parts of Florida and in Georgia, which will ultimately be developed. The product in 1896 amounted to 9,872 short tons, worth \$59,360, compared with 6,900 tons, worth \$41,400 in 1895.

The sulphur industry of the United States showed an increased activity during 1896, the total product amounting to 5,260 tons, while that of 1895 amounted to but 1,800 tons. The increase was due to the success in locating the Louisiana deposits, the French production in 1896 amounted to 2,465 tons. The rise in prices due to the Sicilian sulphur combination also stimulated some work in the Texas sulphur deposits.

FURTHER EXPERIMENTS ON THE LIQUEFACTION OF FLUORINE.*

By M. MOISSAN AND J. DEWAR.

In May, 1897, (*Comptes Rendus*, cxxiv, 1202), we had the honor of presenting to the Academy our first experiments on the liquefaction of fluorine; we will now describe some fresh experiments we have made on this subject.

Liquefaction of Fluorine.—Our latest experiments on liquefaction were carried out by means of an apparatus similar to that which we have already described, that is to say, a glass bulb fused to a platinum tube, which contained another similar smaller tube; but each of these tubes was fitted with a screw valve in such a manner that at any moment communication, either with the outer air or with the current of fluorine, could be interrupted. This little apparatus was placed in a cylindrical glass receptacle, with double sides, containing liquid air. The whole was connected with a vacuum pump and furnished with a manometer.

In a series of preliminary experiments we determined exactly the boiling points of liquid oxygen at various pressures, as shown by the manometer.

In some former experiments we had shown that fluorine does not become liquid at the temperature of boiling oxygen at the ordinary atmospheric pressure.

We now find that, by repeating the same experiment with freshly prepared liquid air, the fluorine becomes liquid as soon as the air begins to boil at the ordinary pressure.

We have repeated our former experiment, with liquid oxygen as refrigerant, and, on making a vacuum, we find that the liquefaction of fluorine takes place by the evaporation of the oxygen at a diminution of pressure of 32.5 cm. of mercury.

From these two experiments we are enabled to state that the boiling temperature of fluorine is very close to -187° .

Experiments on Solidification.—When the little glass bulb was three-quarters full of liquid fluorine, we closed both the valves and then caused the liquid air serving as refrigerant to boil rapidly at a diminution of pressure of 72.5 cm. Under these conditions we obtained a temperature of -210° . The fluorine did not show any sign of solidification, but retained its characteristic mobility. To complete this experiment it becomes necessary to cause the rapid ebullition of the liquid fluorine thus obtained; we hope to achieve this in future experiments. When we had repeated this experiment several times, a slight accident occurred to one of our little instruments containing the fluorine. The screw of one of the valves becoming worn, allowed the air to enter the bulb. This air was immediately liquefied, and in a few moments we had two distinct layers of liquid; the upper, colorless layer consisted of liquid air, the lower one, of a pale yellow color, being fluorine.

In another experiment, taking great precautions to prevent the ingress of any air, the fluorine was introduced in its liquid state into a glass tube, the end of which was then sealed before the blowpipe. The sealed tube, containing the liquid fluorine, was kept for a long time at -210° by the rapid evaporation of a large quantity of liquid air, but it gave no trace of a solid body.

Density of Liquid Fluorine.—To determine the density of liquid fluorine, we brought it into contact with a number of bodies whose density is exactly known. By taking groups of bodies whose densities are very close to each other, it is easy to see which sink and which float in the liquid. This well-known though indirect method was the most suitable for these delicate experiments. We first of all satisfied ourselves that the fluorine had no action on the materials used. To effect this we placed a crystal of sulphocyanide of ammonium (density = 1.31)

in a glass tube surrounded with boiling liquid air; we then turned in to the bottom of the tube a current of fluorine gas by means of a platinum jet. The fluorine was rapidly liquefied, and the sulphocyanide of ammonium was not attacked. We repeated the experiment with a fragment of ebonite ($D = 1.151$, of caoutchouc ($D = 0.99$), of wood ($D = 0.96$), of amber ($D = 1.14$), and of oxalate of methyl ($D = 1.15$). It is of importance, in the experiments we have just mentioned, that the various materials used should be first kept at a temperature of -200° for some little time.

In one of our experiments a piece of caoutchouc, having been insufficiently cooled, took fire in the surface of the liquid and burnt completely away with a brilliant flame, without leaving any residue of carbon.*

The experiment was carried out in the following manner: In a glass tube closed at one end, and of which the lower part had been slightly drawn out, we placed fragments of the five substances we have just mentioned. The tube was then plunged to a third of its length into boiling liquid air. When it was all reduced to a temperature of about -200° we carefully introduced the fluorine gas. This soon became liquefied, and we saw the wood, the caoutchouc and the ebonite floating easily on the surface of the pale yellow liquid. On the other hand, the oxalate of methyl remained at the bottom, while the amber rose and fell in the liquid, appearing to be of the same density. The apparatus was shaken several times, and the quantity of liquid fluorine increased, but the results were always the same.

We, therefore, arrive at the conclusion from these experiments that the density of liquid fluorine is 1.14. Another point which appears to be of interest is the following: The fragment of amber floating in the fluorine was very difficult to distinguish, which would seem to indicate that the index of refraction of liquid fluorine is very close to that of solid bodies.

In another experiment we liquefied fluorine in a glass tube which had been previously graduated; we then sealed the tube, which had been weighed before the experiment, and left it alone in a beaker full of liquid air at the ordinary pressure. An hour and a half afterward, the tube still being in 1 cm. of liquid air, the fluorine had not changed in appearance. But shortly afterward, when the air had all evaporated, a violent detonation occurred; the sealed tube and the double beaker in which it had been placed were smashed and reduced to powder. The sealed tube showed us that liquid fluorine sustains at -187° to -210° a diminution of volume of 1.14.

Absorption Spectrum.—We examined with the spectroscopic different samples of liquid fluorine through a thickness of about 1 cm., either in sealed tubes or by means of our little condensing apparatus, but we have never been able to detect absorption bands.

Magnetism.—Liquid fluorine placed between the poles of a powerful electromagnet does not show any magnetic phenomena. These experiments are the more decisive, as we made comparative ones with liquid oxygen, as before; they were repeated several times.

Capillarity.—The capillary constant of fluorine is weaker than that of liquid oxygen. A capillary tube plunged successively in fluorine, oxygen, alcohol and water, gave the following figures:

Height of liquid fluorine	3.5 mm.
Height of liquid oxygen	5.0 mm.
Height of alcohol	14.0 mm.
Height of water	22.0 mm.

The Action of Some Substances on Liquid Fluorine.

Hydrogen.—Liquid fluorine in a glass tube was cooled down by liquid air boiling at a low pressure. A slow current of hydrogen gas was made to impinge on the surface of the yellow liquid by means of a platinum jet. There was immediate combination, with the production of a flame which lighted up the tube. The experiment

**Comptes Rendus*, cxxv., No. 15, p. 505, 1897; through *Sci. Am. Supplement*.

*This piece of caoutchouc ran about the surface of the liquid like sodium on water, giving a very intense light.

was repeated by dipping the platinum jet below the surface of the liquid. At this temperature (-210°) complete combination still took place, with a considerable evolution of light and heat.

In another experiment the hydrogen apparatus terminated with a fine glass tube dipping into the liquid fluorine; when the hydrogen was turned on, the combination took place immediately and with violence.

Oil of Turpentine.—Oil of turpentine, frozen and cooled down to -210° , is attacked by liquid fluorine. To perform this experiment we placed a little oil of turpentine at the bottom of a glass tube surrounded with boiling liquid air. As soon as a small quantity of fluorine was liquefied on the surface of the carbide the combination took place with explosive force, a brilliant flash of light and deposition of carbon. After each explosion the current of fluorine gas was kept up slowly, a fresh quantity of liquid fluorine was formed and the detonations succeeded each other at intervals of from six to seven minutes. Finally, after a longer interval of about nine minutes, the quantity of fluorine formed was sufficient to cause at the moment of reaction the complete destruction of the apparatus.*

Oxygen.—The action of liquid oxygen has been studied with much more care, since we observed from our earliest experiments that by passing a current of fluorine through liquid oxygen we obtained a detonating body.

If we bring a current of fluorine on to the surface of liquid oxygen in a glass tube, the fluorine dissolves in all proportions, imparting a yellowish color, and giving the liquid a graded tint from the upper to the lower part; the bottom of the tube is hardly colored. If, on the contrary, we introduce the fluorine gas at the bottom of the liquid oxygen, the yellow color is produced at the bottom and diffuses slowly to the upper layers.

This phenomenon indicates that the densities of liquid fluorine and oxygen are very near each other. When we have obtained a mixture of liquid oxygen and fluorine, if we allow the temperature to rise slowly, the oxygen evaporates first. The liquid becomes more and more concentrated as to fluorine, and finally the latter begins to boil in its turn. In fact, at the commencement of this boiling the gas coming off will light a match which has only a red-hot point, and will not make lampblack or silicon red hot; but, on the other hand, the gas coming off at the end of the experiment will instantly cause these two latter bodies to burst into flame. When the glass bulb is completely empty and its temperature is rising, we suddenly notice a distinct disengagement of heat, and the interior of the glass loses its polish. This rise of temperature is due to the fluorine gas attacking the glass. In this experiment, when using perfectly dry oxygen, no precipitate is produced. If, on the contrary, we use oxygen which has been some hours in contact with the air, the detonating substance we mentioned in our previous communication is produced with great readiness.

In one of our experiments, in which we tried to obtain a notable quantity of this body, we had an explosion strong enough to smash the glass in which the experiment was being performed.

To sum up, this body, which is produced by the action of fluorine on moist oxygen, seems to be hydrate of fluorine, decomposing, with detonation, by a simple rise of temperature.

Water.—We froze and cooled down to -210° a small quantity of water at the bottom of a glass tube. Liquid fluorine formed on the surface of the ice as a mobile liquid without action, and it evaporated on the temperature rising. As soon as the apparatus became warmer the remaining gaseous fluorine attacked the ice with great energy, and we noticed a strong smell of ozone.

*In several of our experiments we accidentally let a little liquid fluorine fall on the floor; the wood instantly took fire.

Mercury.—We solidified a globule of mercury at the bottom of a tube. The surface remaining very brilliant, the liquid fluorine surrounded it without causing it to lose its appearance or polish. On allowing the temperature to rise to -187° , the fluorine began to boil, the liquid disappeared completely, but the attack of the mercury by the fluorine gas did not take place until the apparatus had almost reached the temperature of the laboratory.

Conclusions.

Fluorine gas is easily liquefied at the temperature of boiling atmospheric air. The boiling point of liquid fluorine is -187° . It is soluble in all proportions in liquid oxygen and in liquid air. It does not solidify at -210° . Its density is 1.14, its capillarity is less than that of liquid oxygen; it has no absorption spectrum and it is not magnetic.

Finally, at -210° it has no action on dry oxygen, water or mercury, but it reacts, with incandescence, on hydrogen and oil of turpentine.

THE STRUCTURE OF BACTERIA.

The actual intimate structure of micro-organisms is a subject which has as yet received but little attention from English bacteriologists. It is not revealed by the methods of staining, or indeed the amount of magnification which suffices for diagnostic purposes, and its study has the double disadvantage of requiring special skill and leading to no obvious and immediate results of practical clinical importance. Nevertheless, much time has been devoted to it by continental observers, and M. Duclaux, in an excellent summary of our present state of knowledge, in a recent number of the *Annales de l'Institut Pasteur* (*Tr. Med. Jour.*) refers to a formidable list of forty memoirs bearing upon it.

The opinions expressed show a good many discrepancies, mainly arising from a common cause. Differences of structure in normal bacilli are hard to detect, for the whole protoplasm appears homogeneous; it is therefore necessary to study them either when they have become old and are commencing to disintegrate or with the aid of coloring reagents. The question then arises as to how far the appearances then presented may be taken as indications of the normal structure. The plasma of the bacteria is a gelatinous substance, readily coagulating with the aid of heat or reagents. This has been shown by Butschli, who has actually succeeded in squeezing out this gelatinous material from its envelope. The ease with which the jelly coagulates under different circumstances is one of the main sources of difficulty in its differentiation. One set of observers, among whom A. Fischer and Migula are conspicuous, regards a bacillus as consisting of a capsular membrane containing a mass of protoplasm with a central vacuole, but no nucleus. The vacuole, however, depends too much upon the viscosity of the protoplasm, and, therefore, upon external conditions, to have, in Duclaux's opinion, the importance assigned to it by them. Migula, in fact, considers that the division of a bacterium is preceded by binary fission of the vacuole. Butschli, on the other hand, has studied bacteria and larger, but almost as lowly, fungi, the cyanophytes, by faintly coloring them with acid hamatoxylin. He distinguishes a bacterium into three parts, a membrane which does not take the stain at all, a faintly staining peripheral zone, and the much discussed deeply staining central body.

Butschli considers this central body to be, if not a nucleus, at least allied to one in its nature. He has twice, in the case of *Beggiatoa*, been enabled to detect karyokinesis in it. No difficulty is found in accepting this view as regards the cyanophytes, in which, although large, the central body does not entirely preponderate; but in the smaller bacteria it is found to occupy the whole membrane, the protoplasm being reduced to a mere semi-lunar thread at each end. This assumption

that a bacterium consists practically entirely of a nucleus, with the nutritive protoplasm reduced to a minimum, has not been generally accepted by bacteriologists. Metchnikoff has well compared it to the condition in embryonic cells and in mycoplasmas—that is, where nutritive activity is greatest. Duclaux suggests that protoplasm is, so to speak, the kitchen for the nucleus, which, when in a very active state, can take in its food raw. It will possibly be found that when storage of starch, etc., takes place in a bacterium, protoplasm may be developed around the nucleus as a "tissue of reserve."

Another most interesting question is as to the histology of spore formation. Babes was the first to demonstrate in a number of bacteria, and particularly in that of diphtheria, minute particles taking a violet or reddish stain with methylene blue, and so standing out in sharp contrast to the blue ground.

They were most numerous at the center and extremities of the rod, as if associated with division and growth. He gave them the non-committal name of "metachromatic granules."

Butschli has described them as mainly occurring in the thin protoplasmic layer already mentioned. Certain of them appear to take part in the formation of spores, and here, again, a difference of opinion has arisen.

Ernst described "sporogenic granules" staining with bor, but not boiling, methylene blue, as appearing in certain bacilli under conditions favorable to spore formation, and running together in places to give rise to spores. But Bunge pointed out that these granules were present in some bacilli which did not form spores, and absent in typical spore-bearing forms such as the anthrax bacillus; and further, that, unlike spores, they did not resist boiling water. He himself describes granules staining less easily than those of Ernst, which appears to fulfill these conditions. They require treatment with an oxidizing agent before they are capable of taking the ordinary stains.

In the anthrax bacillus three or four rounded granules can be seen, which eventually fuse into an oval spore. These granules withstand the action of boiling water, and in this respect and the difficulty with which they are stained agree throughout with the spores themselves. This would seem to show that the difficulty of staining the latter is due to a quality of the material of which they are composed, and not to their being enveloped in an impermeable membrane. One final point remains for solution—to bring the conclusions of Butschli and of Bunge into harmony it must be shown, as Duclaux points out, that the granules of the latter are formed by the "central body" of the former. This is an important thesis for future observation.

FUMIGATING MIXTURE FOR ASTHMA.—Powd. anise (15 p.), powd. fennel (15 p.), powd. sumbul (7.5 p.), powd. stramonium leaves (7.5 p.), potassium iodide (3.75 p.), and potassium nitrate (60 p.). (Ap. Ztg.)

ADULTERATED FENNEL.—In Austria fennel seed has recently been met which had been deprived of the ethereal oil and its appearance improved by coloring artificially. An investigation brought to light the fact that this industry was being carried on on a large scale in a small town on the frontier. The modus operandi was to separate the oil by distillation with steam and after drying the seeds in the air, to mix them by means of a shovel with chrome yellow, to which a little fat had been added. The excess of coloring matter was removed by sifting. Damaged fennel, such as had acquired a dark, unsightly appearance, was colored in a similar manner. It was put on the market mixed with 30 to 50 per cent. of good seeds. This process of coloring gives the seeds an even yellowish green color. When moistened with water and pressed between filter papers, the latter will be stained greenish yellow. (Ap. Ztg.)

PHARMACY.

ANESON.—The local anæsthetic known until recently as "Anesin," now bears the name of "Aneson."

REMEDY FOR SCABIES.—Sulphur, beech-nut oil, of each 20 parts; soft soap, lard, of each 40 parts; powdered chalk 5 parts. For external use. (Südd. Ap. Ztg.)

A SOLUTION FOR DESTROYING PLANT LICE consists of salicylic acid (1 p.), soft soap (2 p.), extract of quassia (50 p.), and tincture of colocynth (5 p.). (Südd. Ap. Ztg.)

MILK-SOMATOSE is a dietetic preparation made from casein with addition of 5 per cent. of tannic acid. It is analogous in composition and action to ordinary somatose, which is prepared from meat. (Ph. Post.)

TANNON.—A condensation product of tannic acid and urotropine. It is a light brown, tasteless powder, nearly insoluble in water, weak acids, alcohol or ether, soluble in weak alkalies. Used for enteritis. (Ap. Ztg.)

REMEDY FOR ASTHMA.—Sodium iodide, tincture of stramonium, of each 5 to 12 parts, extract of licorice 4 parts; syrup of squill, 30 parts; distilled water, 250 parts. Dose, a tablespoonful 3 or 4 times a day. (Südd. Ap. Ztg.)

CEMENT FOR AMBER, MEERSCHAUM AND IVORY.—Soften 8 p. of isinglass in water containing a little alcohol. Add to it 1 p. of galbanum, 1 p. of gum ammoniac and 4 p. of alcohol. The mixture is used hot. (Chem. Ztg.)

TO POWDER SOAP WITHOUT MILLING.—A considerable quantity of glue is added to it during the boiling. This causes it to form a granular powder when it cools, which is dried and sifted. The process is patented. (Südd. Ap. Ztg.)

URSAL is a combination of urea and salicylic acid, claimed to be particularly useful, when the combined effect of the two components is desired. It is substituted for sodium salicylate in the same doses, in powders or tablets. (Ph. Post.)

PILULE ROBORANTES are prepared from beef blood and beef juice. They contain in 3 pills the salts of 2 gm. of blood and 1 gm. of meat. They have been used with success in acute and chronic anæmia, and chlorosis. (Ap. Ztg.)

A MIXTURE FOR LEAKING BARRELS.—Melt at a low heat a mixture of lard (30 p.), rock salt (30 p.), wax (10 p.), and paraffin (6 p.). To this add 25 p. finely sifted wood ashes. This cement is applied warm over the leaky places. (Drog. Ztg.)

REMEDY FOR URTICARIA.—The following is recommended: Menthol (5 p.), chloroform, ether, spirit of camphor (of each 15 p.). The affected parts are rubbed with this mixture and, while moist, dusted over with rice starch or zinc oxide. (Ap. Ztg.)

MENTHOL FOR AFFECTIONS OF THE SKIN.—For contusions an application of a 10 to 20 per cent. menthol collodion is recommended twice daily. For chapped skin: menthol (0.5 p.), salol and olive oil (of each 1 p.), lanolin (50 p.). (Ap. Ztg.)

SYNTHESIS OF CODEINE.—A new process for preparing codeine from morphine has been patented by the Farbenfabriken, formerly Fr. Bayer & Co. It consists in adding a cold ethereal solution of diazomethane to a solution of morphine in absolute methyl or ethyl alcohol.

TINCTURE OF MYRRH IN DIPHTHERIA.—Tincture of myrrh (2 p.), glycerin (4 p.), water (94 p.) Of this mixture 5 to 15 Gm. (1½ drams to ½ ounce), doses are given at intervals of ½ to 2 hours, day and night. A gargle of a 0.5 p. c. solution of resorcin is used in connection with it. (Ap. Ztg.)

PARAL is a new toilet cream, prepared by fusing together lanolin and paraffin. Admixture with paraffin renders lanolin capable of taking up much more water than it would otherwise, the amount of water in this preparation being 50 per cent. It is said to keep a long time without becoming rancid. (Ap. Ztg.)

ETHER AS DIURETIC.—Ether has recently been recommended in uraemia as an excellent stimulant and diuretic. It is given in 2 cc. doses subcutaneously and a teaspoonful internally in sweetened water every hour. In cases where injections are not borne well, a teaspoonful is given every half hour. (Ap. Ztg.)

OVARADEN is a preparation of ovaries, which is stated to contain the active constituents in an unchanged form and to represent twice its weight of the fresh substance. It is an odorless and tasteless powder and is in the market in powder and tablet form. The dose is 1 to 2 Gm. (15 to 30 grains) daily. (Ph. Post.)

CEMENT FOR RUBBER ON METAL.—Powdered shellac (1 p.) is macerated with strong ammonia water (10 p.) A fluid transparent mass forms in 3 to 4 weeks. This mixture, when applied to the rubber, softens it at the point of contact and after volatilization of the ammonia a perfect union of rubber and metal is the result. (Ap. Ztg.)

THYRADEN.—A nearly white, odorless powder, having the taste of milk sugar. It contains the total iodine present in the thyroid gland, in its natural combination. The preparation is standardized, by the addition of milk sugar, to contain .07 per cent. of iodine and keeps indefinitely. Single doses, 0.15 to 0.3 Gm. (2 to 5 grains), (Ap. Ztg.)

POTASSIUM CHLORATE TOOTHPASTE.—A paste well recommended is composed of powdered potassium chlorate, 1 part; precipitated calcium carbonate, powdered soap, orris root and glycerin, of each 5 parts with perfume ad libitum. Potassium chlorate must not be triturated with organic substances unless previously well moistened. (Ph. Ztg.)

SALITANNOL is a white, amorphous powder, nearly insoluble in alcohol and entirely insoluble in most other solvents. It is produced by the action of phosphorus oxychloride on a mixture of gallic and salicylic acids. Salitannol is antiseptic and may prove useful in wound treatment because of its insolubility and neutral chemical behavior. (Ph. Post.)

ACTIVE CONSTITUENTS OF ARUM.—An investigation of *Arum maculatum* and *A. italicum* by Herbert and Heim (Compt. Rend.) has resulted in the discovery of a volatile alkaloid resembling conine. The plants yield 4 to 5 per cent. of it. It is a brown oily fluid having a mouse-like odor and is weaker than conine physiologically. Saponin was also found. (Südd. Ap. Ztg.)

OINTMENT BASES.—The Pharm. Post publishes the composition of several ointment bases in frequent demand in German pharmacy; among these are:

Adipatum.	
Anhydrous Lanoline	35 parts
Vaseline	33 parts
Paraffin	7 parts
Distilled Water	5 parts
Unguentum Lanolini.	
Anhydrous Lanoline	65 parts
Liquid Paraffin	3 parts
Solid Paraffin	5 parts
Distilled Water	30 parts

IODOCROL (Carvoerol Iodide) is prepared by dissolving 2 parts of carvol and 38 parts of potassium iodide in 40 parts of a 10 per cent. solution of sodium hydrate. It is soluble in ethereal and fatty oils, ether, benzol, chloroform and carbon disulphide. As a substitute for iodoform it has the advantages of being heavier than the latter and of being odorless. (Ph. Post.)

CRITICAL POINT.—Leduc & Sacerdote (Rev. Sci.) have made use of an original method to ascertain the critical point of certain substances they were investigating. They took the critical point to be that at which light ceases to be diffracted by the surface of any as yet unvolatilized liquid. By this method they were able to calculate their results to within 0.5° C. and one atmosphere.

FORMULÆ FOR FRECKLES.—(1) Corrosive sublimate (0.05 p.) and white sugar (22 p.) are mixed with the white of one egg and then lemon juice (30 p.) and sufficient water added to make 300 p. This preparation is rubbed on the face every morning and allowed to dry upon it. (2) Chloral hydrate (10 p.), carbolic acid and tincture of iodine (of each 5 p.). To be applied with a soft brush. (Ap. Ztg.)

TO REMOVE RUST FROM IRON UTENSILS.—A mixture is recommended, which is prepared by mixing tragacanth paste with a solution of tartaric acid containing a little sulphuric acid, and further adding aqueous solutions of ferrous sulphate, potash alum and rosolic acid. The mixture is painted over the rusty parts several times, whereupon the rust is dissolved and may be rubbed off. (Drog. Ztg.)

PASTE FOR PAPER UPON GLASS.—Labels affixed to bottles by means of sodium silicate are after a few hours so tightly fastened that they cannot be detached by moistening, but must be scraped off. The sodium silicate solution should be of syrupy consistence. If necessary, it is concentrated by evaporation, after addition of 25 per cent. of sugar and a little glycerin. It must be applied very sparingly. (Ph. Rdsch.)

ICHTHYOL is recommended by Le Tanneur (Wien. Med. Bl.) for lung and throat diseases. He emphasizes the advisability of administering it in gluten capsules, which do not dissolve until they reach the intestines. It must be given in large doses, at least 8 capsules of 0.25 gm. (4 grains) each a day, best taken in two portions immediately after meals. It can be continued for months, without causing disturbances. (Ap. Ztg.)

A NEW PREPARATION FOR PRODUCING GLOSS ON LINEN.—Calcium carbonate, 1 part, and wax, 4 parts, are made into a white saponaceous mass by boiling with a sufficient quantity of an alcoholic solution of soap. This mass is rubbed with a sponge over the linen, previously starched and ironed. The iron is then passed over it again a few times. The linen thus treated acquires a fine velvet-like gloss. (Südd. Ap. Ztg.)

FUMIGATION WITH CORROSIVE SUBLIMATE.—The destruction of disease germs in living rooms by fumigation with corrosive sublimate has been proposed from time to time, but the chief argument against it has always been, that the sublimate, which condenses on the walls, is liable to have a deleterious effect on the health of subsequent occupants of the rooms. Prof. Koenig now directs to proceed as follows: 15 to 60 Gm. of corrosive sublimate, depending on the size of the room, are spread out on a heated plate, and doors and windows carefully closed. After 3 or 4 hours the room may be entered to open the windows, mouth and nose being protected by means of a wet sponge. On the following day the doors and windows are again closed and the room fumigated with burning sulphur. A day later the room is aired and thoroughly cleaned. (Südd. Ap. Ztg.)

HYPEREXESE.—A proprietary remedy bearing this name is recommended as a certain cure for many ills and particularly for migraine. It is offered in three different strengths (?), in the form of liquids having an alcoholic odor and a more or less yellowish color. According to Dr. Aufrecht they are composed of 31 to 35 per cent. of alcohol, 0.006 to 0.014 per cent. of caramel and water. (Ph. Ztg.)

ANTI-DIABETICUM (Glycosolveol), a preparation recommended for diabetes, has been analyzed by Dr. Aufrecht and found to be composed of about 82 per cent. of wheat starch, sulphur, sugar of milk, powdered senna leaves and fennel. According to the prospectus of the manufacturer, the remedy is the result of a reaction between oxy-phenyl-propionic acid and peptone, and of a combination of theobromine with the zymogen of trypsin. (Ph. Post.)

PROCESS FOR MANUFACTURING ARTIFICIAL WAX.—The wax is composed of paraffin, rosin and olive oil and made by a patented process as follows: 100 parts of paraffin are melted at a very low temperature; to this 150 parts of rosin are added and when the mixture is completely liquid, the oil, previously heated, is stirred in. The mixture is vigorously stirred until homogeneous and is then poured into molds to solidify. (Rev. d. Ch. Ind., through L'Union Ph.)

ARTIFICIAL OIL OF CINNAMON.—A new process for manufacturing cinnamic aldehyde, of which oil of cinnamon consists almost entirely, has been patented. An alcoholic solution of benzoic and acetic aldehydes is treated at a low temperature with a concentrated solution of caustic soda. The mixture is kept constantly agitated for several hours. The cinnamic aldehyde formed is then separated by dilution with water, neutralized with hydrochloric acid and rectified in vacuo. (L'Union Ph.)

PRECIPITATION OF MAGNESIUM CITRATE SOLUTION.—In a series of experiments on this subject M. Mansier (Le Centre Med. et Ph.) arrived at the result, that if the solution of magnesium citrate is heated to 90° C. or boiled, and not charged with carbonic acid gas, the precipitation of a magnesium citrate is largely prevented; but there is a rapid development of fungus growths. If the solution is heated and subsequently charged with gas, fungus growth is prevented, but the deposition of citrate is more rapid. (L'Union Ph.)

LECITHIN.—The influence of lecithin on the growth and multiplication of organisms has been observed by Danilewsky. Subcutaneous injections largely increase the red blood corpuscles in dogs. Frogspawn and tadpoles develop much more rapidly in water to which a little lecithin is added. It is not probable that such a small quantity can exert a direct influence on the nutrition, but can act only by stimulating the development of cell life. This is shown in a similar manner with plants. Watercress grows in presence of a little lecithin much longer and stronger roots. (Ap. Ztg.)

HEMORRHOIDS.—The Paris correspondent of the Therapeutic Gazette says that the following ointment is strongly recommended by Dr. Monin, of Paris, in cases of hemorrhoids:

R Camphorated Lanoline, 40 grammes.....	5	14
Castor oil, 10 grammes.....	5	24
White precipitate of mercury, 5 grammes.....	5	14
Conium bromhydrate, 2 grammes.....	5	12

The following is advised by Fenner:

R Lanolin.....	iv.
Petrolati.....	ij.
Glycerin.....	j.
Distilled ext. hamamelis.....	ss
Tannin.....	ss
Po. Opii.....	ss

M. Sig.: Apply locally.

LIQUID CARBONIC ACID TO PREVENT FORMATION OF BOILER CRUST.—The crust, which consists principally of calcium carbonate, is dissolved by carbonic acid through formation of the soluble bicarbonate. The boiler is filled with cold water and connected with a cylinder of liquid carbonic acid. A pressure of several atmospheres results, which serves to increase the solvent power of the acid and induces a rapid solution of the deposit. The boiler is not injured in the least by this treatment, which is claimed to be simple and cheap. (Drog. Ztg.)

MANGANESE IN TREES.—In the light of the recent researches on the oxydases recently recorded before the Académie des Sciences and the influence of manganese on vital oxidation, it is interesting to find that Guerin states that this metal is universally present as an organic compound in the liqueous tissues of trees (compt. rend. Sci. Amer.) If sawdust is treated with feebly alkaline water and the extract is acidulated with hydrochloric acid, a precipitate will be obtained which, when washed with acid water and burned, is found to contain no iron, but 0.4 per cent. of manganese and 4.6 per cent. of nitrogen.

	Leaf Texture, Stalk & Midrib.	
	P. c. digitoxin.	P. c. digitoxin.
1891.....	136	090
1895.....	291	121
1897.....	340	133

(Ap. Ztg.)

A COOLING EYE SALVE.—Dr. Sweet has employed with satisfactory results the eye salve suggested by Dr. W. Allan Jamieson, of London. It is composed of lanoline, 3 drams; oil of sweet almonds, $\frac{1}{2}$ dram, and distilled water, $\frac{1}{2}$ dram. In this form it may be employed to prevent the lids becoming glued together by any mucous secretion; while in eczema of the lids it forms an excellent vehicle for the yellow mercury oxide, of which two grains may be added to each half ounce. The salve gives a pleasing sensation of coolness to the lids without any irritation or smarting, and seems to be superior in some cases to salves prepared with other bases.—Philadelphia Polyclinic.

A NEW RAT POISON.—A preparation containing no arsenic or phosphorus, said to be sure in its effect, and eaten with great avidity by rats, which are sometimes a great nuisance, as well as by mice, is made according to the following directions: Cut an onion into small pieces and roast with 500 gm. of lard (to which in the summer a little tallow should be added), until the pieces are dark brown and the fat has acquired an agreeable onion odor. Dissolve in the mixture 5 gm. of salicylic acid, strain and stir the mixture until it begins to thicken. Then add 500 gm. of precipitated barium carbonate and 50 gm. of an ammoniacal 20 p. c. solution of verlegris and mix thoroughly (Sidd Ap. Ztg.)

SURINAM COPAIBA.—This variety is obtained from *Copaifera Guianensis*, a large tree having a very thick bark. In order to obtain the balsam, deep triangular holes are cut into the interior, sometimes round holes are bored obliquely upward toward the center. The balsam flows in a stream, but after a time stops abruptly and after a short while starts flowing again. When it finally ceases, the holes are stopped up; after one or two years they may be tapped again. The yield of a tree is said to be about 20 liters, the greatest yield being obtained after the rainy season, in February and August. The product is colorless and, when warm, has the consistency of olive oil. (Tijdsch. v. Ph., through Ap. Ztg.)

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, JANUARY 13, 1898.

No. 2.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates:

U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483,
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL..... 39	Crown Perfumery Co.'s Suit 57
CORRESPONDENCE..... 42	Washington Meeting of the
ERA COURSE IN PHARMACY..... 43	American Chemical Soci-
Inorganic Chemistry..... 43	ety..... 58
Botany..... 46	News Letters..... 60
PHARMACY..... 52	BUSINESS RECORD..... 68
QUESTION BOX..... 52	Greater New York Board
NEWS DEPARTMENT..... 55	Organizes..... 69
Granville Turns from	New York City Board Re-
Drugs to Groceries..... 55	ports..... 69
Prosecutions of Drug	German Apothecaries Meet
Swindlers..... 55	TRADE DEPARTMENT..... 71
Cut in Empty Capsules..... 56	State of Trade..... 71
Work of the League for	New York Market Report..... 72
Shorter Hours..... 56	DRUGGISTS' ADVERTISING..... 73
Torrey-Henderson Bank-	PRICES CURRENT..... 75
ruptcy Bill and N.W.D.A. 56	TRADE NOTES..... 78
Wholesale Drug Trade	
Bowling Tournament..... 57	

"The British and Colonial Druggist," London.

Subscriptions and advertisements for this weekly drug journal will be received and forwarded through this office. Specimen copies and schedule of rates will be furnished upon application.

THE ERA BINDER.

The progress of the art of pharmacy is constantly modifying the value of the text books and reference works and this gives rise to the necessity for the drug journal whose purpose is to record all those acts, events and discussions which finally crystallize into the positive statements of the text books.

This recognition of the value of the drug journal suggests the idea that it should be regarded as a part of the pharmacist's working library, and further that it should be preserved in shape for frequent and handy reference. For the attainment of this object a suitable binder is a necessity.

The numbers of the Era contain much that every pharmacist should preserve. There are formulas, processes, discoveries and discussions which are of interest and of positive value if kept for convenient reference. A binder is furnished for 75 cents which holds the numbers of the Era (two volumes) for one year if the advertising pages are omitted, or the numbers for a half year (one volume) if the advertising pages are included. Sent postpaid on receipt of price.

After Vacation, Work.

In this issue the lectures of the Era Course in Pharmacy are resumed, and the class of more than a thousand students is welcomed back to study. All of its members have enjoyed vacation time, some, perhaps, more than others, and in varying manner. Some, doubtless, have spent the time in study and collateral reading that they might be better enabled to prosecute the work yet to come. That work is now here, and we are glad to have the students with us again. We believe they all return to their studies with renewed energy and the belief that as success has marked their efforts in the part of the curriculum just passed, so will it crown their exertions in the future. We welcome them back.

Education is a process of development. It commences with our earliest experiences and, if followed to its logical conclusions, leads us into enlarged surroundings and special lines of thought and work. In the study of these lectures many of us have caught for the first time a glimpse of but a very small part of the boundless field of science. The study of chemistry and physics has given some of us new conceptions of the constitution and properties of "matter," while others have gained a new insight into the manifestations of life and life processes in their study of the lecture on botany by Prof. Kraemer. All of us know more about the scope of materia medica and therapeutics, and the reciprocal rights and duties of the physician and pharmacist than we did before we studied the introductory lecture by Dr. Rusby. All of these subjects have a distinct bearing upon the intelligent practice of pharmacy. An understanding of them furnishes him thus equipped with resources and superior strength to struggle with the difficulties which beset pharmacy to-day. "A little knowledge is a dangerous thing," but it is only knowledge which gives power, real, digested, assimilated knowledge. We shall watch your progress as your answers to the questions submitted are sent in. We know the study will have an important influence upon your daily work and we believe it will have a most important bearing upon your future in the practice of pharmacy.

A Cure for Druggists' Ills.

We are fast approaching that point where we can believe science can do anything. Our credulity was severely tried, however, last week, by press dispatches which stated that Prof. Elmer Gates, of the Smithsonian Institution at Washington, after years of scientific investigation, declares that science will put an end to all crime. We are told that "this is the calm judgment of a deeply learned man who has devoted his life to research." Prof. Gates announces not as a possibility but as a fact that the murder in a man's brain can be removed by the surgeon's knife. If a man is naturally a thief his brain can be cut and treated so that all desire to steal shall disappear. No matter what criminal tendency is developed it can be cured. It is not a question of building up will power, of fortifying moral sense. It is simply a question of surgical and medical science. The only difficulty, and it is one that exists in all diseases, is in tracing the trouble to its seat. Prof. Gates explains the process scientifically with the employment of many tech-

nical words that are more or less confusing to laymen, but the principle is simple enough."

Truly, it is simple, and oh, if it be true. Think of the indefinite application of this principle. We would like to get together an assorted carload lot of cutters, dispensing doctors, prescribing druggists, liquor-selling druggists, physicians' supply concerns, and railroad them to Prof. Gates by fast express and have the appropriate chunks cut out and their brains trimmed down till each and every one of them could be returned to his home a mild and inoffensive citizen, whose future acts would be entirely innocuous and praiseworthy. We would like to try it on our friends and on our enemies, on ourselves, too. We fear, though, that in many cases so much of the brain would be sacrificed to remove evil instincts that there would be little left, and the skull would cave in. But we must stop these fascinating speculations, and crush down the hope that has risen in our breast; there is a possibility that Prof. Gates is too sanguine, and the scheme will not work.

First Ohio: Now Wisconsin.

The Wisconsin Board of Pharmacy has been circulating a "Warning to Dealers in Medicines" which calls attention to the new law regulating the quality of food and drugs, and especially that section which reads:

"Sec. 6, No person by himself, his servant or agent, or as the servant or agent of any other person, shall sell, exchange, deliver, or have in his possession with the intent to sell, or exchange, any medicine known as proprietary, or of which the formula is kept secret by the manufacturer, which contains morphine, strychnine, cocaine or poisons or narcotic alkaloid or drug in any quantities, which the State Board of Health shall deem harmful to the life or the health of the public, unless the presence of the same be distinctly shown by the label upon the bottle or package and upon the outer wrapper thereof."

The circular says that druggists and general dealers having suspected preparations of this kind in stock should at once secure themselves from loss by prosecution by taking a written guarantee from the jobber or manufacturer, that their preparations do not contain poisonous drugs, and are not deleterious or dangerous to health.

It is the intention of the board to prosecute for the sale of medicine containing these dangerous drugs, unless each and every bottle or package containing them is labeled according to law, and it calls upon every honest citizen, and especially druggists and physicians, to aid in correcting what is believed to be one of the most serious abuses of the times, and a menace to the health and happiness of many thousands of people.

The circular concludes by saying that general or department stores will be held responsible for the quality of all goods sold by them, such as ammonia, witch hazel, essence lemon, peppermint, ginger, and this class of goods.

The Determination of Sex.

A question which has perplexed the human race since the days in Eden has been revived by Dr. Schenk, of Vienna, who claims to have discovered the secret influencing the sex of the progeny of man and animals. This news comes by cable, and in spite of the fact that the discovery of this secret has been often heralded by lesser lights of biology and profound guessers, the newspapers have given it much valuable space which might otherwise have been devoted to murders and freaks, and have also interviewed many scientists who have confessed that they know a great deal about the matter all the time, but didn't feel like mentioning it.

The subject has the merit of attractiveness for those persons who shudder at the narrow escape which they had from being born female instead of male, or vice versa, and many worthy persons are already deprecating the dire results of this discovery in a manner and tone which suggest the widespread discussion of a scandal at a tea party.

From the ultra-scientific viewpoint of the pharmacist,

the matter is peculiarly interesting. Professionally, we are all concerned in the cytomitoma and paramitoma of nucleated masses of protoplasm, and often have we delved into the mysteries of the karyomitoma and achromatin of the nucleus and discussed the hypothesis of Balbiani. Details as to the discovery are wanting, but we can hardly wait for them, and in the meantime keep our mind off the possibility that it may upset our adherence to the Weissmanism theory that the germ plasma contains all the primary constituents of the entire organism, and that it causes the production of the new individual by directing the process of division ontogenetically and never neogenetically.

It is dimly hinted that Dr. Schenk has discovered a new food which is metamorphosed by the vital processes into a special pabulum which feeds or modifies the germ plasma in such a way as to determine the character or sex of offspring.

This floundering in science is not much to our taste, and we gladly fall back to the practical side of the matter. The discovery of this wonderful food leads us to bespeak for the druggist its commercial benefit. It surely does not belong to the grocery and provision line. The druggist is already the purveyor of the foods of infancy, and this pre-natal pabulum belongs to him by logic if not by right. Do not his shelves speak eloquently of the existence and value of Mellin's, Eskay's, and the others?

A City's Prescription Prices.

It will be remembered that some months ago one of the city councilmen of Covington, Ky., caused a little excitement among the druggists and district physicians by alleging that the city was charged exorbitantly for medicines for the outdoor poor. He succeeded in getting the city to procure and dispense its own medicines, and he now claims that by this course the expense has been reduced from about \$2,000 to \$800. To prove it he gives a few figures from the record.

District Physician A. has issued 129 prescriptions: total cost, \$34.37; average 27 cents.

Dr. B., 496 prescriptions: cost \$158.10; average 31½¢.

Dr. C., 330 prescriptions: cost \$130.02; average 33½¢.

Dr. D., 435 prescriptions: cost \$141.27; average 32½¢.

Dr. E., 47 prescriptions: cost \$20.49; average 43½¢.

The poor of Covington are getting some pretty cheap drugs, apparently. It is to be hoped they duly appreciate the councilman's interest in their welfare.

Pay Up.

A Baltimore paper on Jan. 1 published an editorial which is calculated to bring joy to many a reader's heart. It is particularly applicable in matters which concern the druggist, and we reprint it here, that it may be cut out and shown to customers when desirable:

"To-day is the first of the year, and a day on which we are supposed to settle up accounts with our consciences, make good resolutions and also pay out money on the credit which has been given us during the year. One only has to think for a minute to realize that this settling of the old year's accounts before entering into the personal and business opening of another twelvemonth, has a most heavy bearing upon trade. The 'little bill' which the grocer asks for when he meets you, signifying that he thinks it has been due long enough, is a small item of itself. It may be only a few dollars, but it means considerable to the man who has advanced you money in the way of goods, practically taking no security but his belief in your personal honesty. The loss, or even the delayed payment of 'that little bill' means to him the loss of considerable of the profit from the sale of his other goods. If all of the grocer's customers refuse to settle their 'little bills' the result is that the grocer cannot settle his big bill with the wholesale firms, and if too many grocers cannot settle their bills with the wholesalers it means financial stringency for the latter, thus injuring and crippling trade."

All of us are wont to complain over dull business and the tightness of the money market. A great deal of this cramp and tightness we can relieve by settling our own 'little bills' with butcher, baker and candle-stick maker, not forgetting the doctor, who has been faithful in his

ministrations during the year, and the druggist, who has filled his prescriptions to your saying, 'I'll pay that next time I come around.' Settle up accounts with your earthly creditors the first thing this New Year, and after that you'll feel in a better frame of mind to make good resolutions and make affairs between you and heaven a little less uneven."

Manufacturer's Right to Control Prices.

An interesting case, the final settlement of which may create a precedent to bear upon the cutting of prices on proprietary articles, is that of the Phenyo-Caffein Co., of Worcester, Mass., against Druggist M. Barkman, of Binghamton, N. Y. It was claimed by the plaintiffs that their goods sold under contract as regards the selling price had been sold by the defendant at a cut-price, and a temporary injunction was asked for to restrain such sales, and was granted on Jan. 3. In a circular letter to the retail drug trade issued by the plaintiffs Jan. 1, they disclaim any intention of interfering with the retailer's legitimate business, but their purpose is to establish a principle which they have long upheld, that by virtue of trade-mark rights they have the right to control the retail price of their goods. The following abstract from the circular letter referred to explains the plaintiff's views of the equities in the matter:

"A public policy that would take from producers of trade-marked goods the right to control the prices of such goods would lessen, or destroy the incentive, on the part of dealers, to handle them, especially in cities where price-cutting prevails. If producers cannot guarantee a living profit to dealers, the seemingly self-evident proposition that producers have a right to the fruits of their industry and to the means of making their industry fruitful must be wrong?"

"The good will of distributors is the means of making the proprietary business profitable. In the sale of common commodities, prices are regulated by competitors, or by the survival of the strongest. If common commodities are temporarily sold without profit by retailers the producers are not thereby injured, because the sale is not lessened. Under the same conditions the consumption of trade-marked goods would be lessened by the advocacy on the part of the dealer, of other goods. Self-preservation should therefore prompt producers of trade-marked goods to do all they lawfully can to resist the encroachments of aggressive cutters."

There is one firm of retail druggists out in Iowa which is determined to have no fooling about the box and cartage question. It has served upon the jobbers with whom it deals the following:

NOTICE!

It is much easier for us to keep track of our box and cartage when charged as such, than when charged on other items on our bill, and as we carry these items on our expense book same as freight and drayage we prefer to have you give us the lowest market prices on our goods, and a reasonable charge for box and cartage, and then we will know "where we are at."

Some of the Missouri River jobbers contend that it is just such things as this which make it desirable to continue the charge.

Restrictions upon druggists in the matter of liquor selling are especially severe in Canada. Hence much gratification will be felt by our brethren across the border if the news is true that the government in addition to allowing druggists to sell proprietary medicines in their original packages which contain 17 per cent. of alcohol, have decided to permit them to dispense not more than six ounces of intoxicating liquor without a doctor's prescription, in cases of accident or sudden illness, where prompt remedies are indispensable. Should this turn out to be true it practically means the restoration to the druggists of the privileges they enjoyed prior to the enactment of the act of last session.

Our English contemporary, the Chemist and Druggist, Eng., always finds it very hard to find in the United States anything worth favorable comment. It particu-

larly dislikes our tariff regulations, so we take a little malicious pleasure in quoting its recent words upon the Dingley act, as follows:

"The measure has again demonstrated the importance of the United States to the world's commerce. In spite of protection, America is by far our best customer. Her purchasing power is second only to that of Britain, and in many branches of our trade, not the least in drugs and chemicals, buoyancy in the United States means activity in Britain. The reverse of course also holds good, for we receive a far larger money value of goods from the States every year than we send her."

That is real nice and nicely said. Thanks.

As a sequel to the item published on page 3 of last week's Era, we learn that the druggists and doctors of Pittsburg, Kan., have "got together" and everything is again lovely. A treaty of peace has been made, under which the Pittsburg Drug Co. agrees to restore former prices of drugs, and the fight upon the Pittsburg Drug Co. and upon the doctors connected with the Pittsburg Drug Co. is to be stopped. There is now the best of good feeling existing between all of the druggists of the city. The war is over, and cut rates on patent medicines are withdrawn.

There is a druggist in West Bay City, Mich., whom we would like to know. He has presentiments and acts upon them. He had one the other night, and it told him his store was going to be robbed. So he went back to the store after midnight and took a hundred dollars back home with him. Between then and morning burglars robbed the cash register of \$4.50. But what we cannot understand is why the presentiment didn't work on that \$4.50, or possibly the druggist feels that \$4.50 is cheap enough for a high-grade presentiment in working order which will save one hundred dollars.

The gum habit has become firmly fixed upon the American people. Its devotees will desist from almost any occupation just for a chew. The gum slot machine in a Chicago drug store was robbed a few nights ago, and the thief was chased by angry citizens. He knew the gum chewer's failing, and, turning in his flight, threw back at his pursuers handfuls of gum; they stopped chasing and went to fighting among themselves for the spoils. The thief escaped, with enough gum reserved for his own chewing.

The secretary of the Wisconsin Board of Pharmacy is proud of the fact that while there were sixty-nine poisoning cases, fifty-two resulting fatally, in that State during the past year, none was due to pharmacists' errors. Carbolic acid was used twice as many times as its closest competitor. For fatal cases the record stands 18 for carbolic acid; 9 for laudanum; 8 for Paris green; 3 each for morphine, strychnine, rough-on-rats, arsenic; 2 for chloroform, and 1 each for corrosive sublimate and oxalic acid.

The superintendent of police in Indianapolis has instructed the members of the force to break up the practice of shooting craps in certain drug stores. Quite a commentary on the conditions of things pharmaceutical in that city, isn't it?

CASEIN-MERCURY.—If a solution of neutral casein-alkali and mercuric chloride is concentrated by evaporation or precipitated by addition of alcohol, a casein-mercury compound is obtained, which differs from a compound prepared by Millon and Commaille from casein and mercuric oxide, in that it is soluble in alkalies. This new compound dissolves in water on the addition of traces of ammonia, sodium bicarbonate, etc., to a perfectly clear fluid, from which no mercury is thrown down by the usual reagents. The compound is intended for medicinal use. (Chem. Ztg., through Ztsch. f. Ph.)

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

HERE'S AN OLD ONE—100 YEARS.

George W. Hoffman, Boonsboro, Md., was interested in the copy of an old drug bill given in these pages recently, but thinks he can go it one better by submitting this one:

Doctor Tulghman		
1	1/2 lb. Bals. Gales	1 1/2
2	3/4 lb. Bals. Gales	1 1/2
3	1/2 lb. Bals. Gales	1 1/2
4	1/2 lb. Bals. Gales	1 1/2
5	1/2 lb. Bals. Gales	1 1/2
6	1/2 lb. Bals. Gales	1 1/2
7	1/2 lb. Bals. Gales	1 1/2
8	1/2 lb. Bals. Gales	1 1/2
9	1/2 lb. Bals. Gales	1 1/2
10	1/2 lb. Bals. Gales	1 1/2
11	1/2 lb. Bals. Gales	1 1/2
12	1/2 lb. Bals. Gales	1 1/2
13	1/2 lb. Bals. Gales	1 1/2
14	1/2 lb. Bals. Gales	1 1/2
15	1/2 lb. Bals. Gales	1 1/2
16	1/2 lb. Bals. Gales	1 1/2
17	1/2 lb. Bals. Gales	1 1/2
18	1/2 lb. Bals. Gales	1 1/2
19	1/2 lb. Bals. Gales	1 1/2
20	1/2 lb. Bals. Gales	1 1/2
21	1/2 lb. Bals. Gales	1 1/2
22	1/2 lb. Bals. Gales	1 1/2
23	1/2 lb. Bals. Gales	1 1/2
24	1/2 lb. Bals. Gales	1 1/2
25	1/2 lb. Bals. Gales	1 1/2
26	1/2 lb. Bals. Gales	1 1/2
27	1/2 lb. Bals. Gales	1 1/2
28	1/2 lb. Bals. Gales	1 1/2
29	1/2 lb. Bals. Gales	1 1/2
30	1/2 lb. Bals. Gales	1 1/2
31	1/2 lb. Bals. Gales	1 1/2
32	1/2 lb. Bals. Gales	1 1/2
33	1/2 lb. Bals. Gales	1 1/2
34	1/2 lb. Bals. Gales	1 1/2
35	1/2 lb. Bals. Gales	1 1/2
36	1/2 lb. Bals. Gales	1 1/2
37	1/2 lb. Bals. Gales	1 1/2
38	1/2 lb. Bals. Gales	1 1/2
39	1/2 lb. Bals. Gales	1 1/2
40	1/2 lb. Bals. Gales	1 1/2
41	1/2 lb. Bals. Gales	1 1/2
42	1/2 lb. Bals. Gales	1 1/2
43	1/2 lb. Bals. Gales	1 1/2
44	1/2 lb. Bals. Gales	1 1/2
45	1/2 lb. Bals. Gales	1 1/2
46	1/2 lb. Bals. Gales	1 1/2
47	1/2 lb. Bals. Gales	1 1/2
48	1/2 lb. Bals. Gales	1 1/2
49	1/2 lb. Bals. Gales	1 1/2
50	1/2 lb. Bals. Gales	1 1/2
51	1/2 lb. Bals. Gales	1 1/2
52	1/2 lb. Bals. Gales	1 1/2
53	1/2 lb. Bals. Gales	1 1/2
54	1/2 lb. Bals. Gales	1 1/2
55	1/2 lb. Bals. Gales	1 1/2
56	1/2 lb. Bals. Gales	1 1/2
57	1/2 lb. Bals. Gales	1 1/2
58	1/2 lb. Bals. Gales	1 1/2
59	1/2 lb. Bals. Gales	1 1/2
60	1/2 lb. Bals. Gales	1 1/2
61	1/2 lb. Bals. Gales	1 1/2
62	1/2 lb. Bals. Gales	1 1/2
63	1/2 lb. Bals. Gales	1 1/2
64	1/2 lb. Bals. Gales	1 1/2
65	1/2 lb. Bals. Gales	1 1/2
66	1/2 lb. Bals. Gales	1 1/2
67	1/2 lb. Bals. Gales	1 1/2
68	1/2 lb. Bals. Gales	1 1/2
69	1/2 lb. Bals. Gales	1 1/2
70	1/2 lb. Bals. Gales	1 1/2
71	1/2 lb. Bals. Gales	1 1/2
72	1/2 lb. Bals. Gales	1 1/2
73	1/2 lb. Bals. Gales	1 1/2
74	1/2 lb. Bals. Gales	1 1/2
75	1/2 lb. Bals. Gales	1 1/2
76	1/2 lb. Bals. Gales	1 1/2
77	1/2 lb. Bals. Gales	1 1/2
78	1/2 lb. Bals. Gales	1 1/2
79	1/2 lb. Bals. Gales	1 1/2
80	1/2 lb. Bals. Gales	1 1/2
81	1/2 lb. Bals. Gales	1 1/2
82	1/2 lb. Bals. Gales	1 1/2
83	1/2 lb. Bals. Gales	1 1/2
84	1/2 lb. Bals. Gales	1 1/2
85	1/2 lb. Bals. Gales	1 1/2
86	1/2 lb. Bals. Gales	1 1/2
87	1/2 lb. Bals. Gales	1 1/2
88	1/2 lb. Bals. Gales	1 1/2
89	1/2 lb. Bals. Gales	1 1/2
90	1/2 lb. Bals. Gales	1 1/2
91	1/2 lb. Bals. Gales	1 1/2
92	1/2 lb. Bals. Gales	1 1/2
93	1/2 lb. Bals. Gales	1 1/2
94	1/2 lb. Bals. Gales	1 1/2
95	1/2 lb. Bals. Gales	1 1/2
96	1/2 lb. Bals. Gales	1 1/2
97	1/2 lb. Bals. Gales	1 1/2
98	1/2 lb. Bals. Gales	1 1/2
99	1/2 lb. Bals. Gales	1 1/2
100	1/2 lb. Bals. Gales	1 1/2

Contra		
1	1/2 lb. Bals. Gales	1 1/2
2	1/2 lb. Bals. Gales	1 1/2
3	1/2 lb. Bals. Gales	1 1/2
4	1/2 lb. Bals. Gales	1 1/2
5	1/2 lb. Bals. Gales	1 1/2
6	1/2 lb. Bals. Gales	1 1/2
7	1/2 lb. Bals. Gales	1 1/2
8	1/2 lb. Bals. Gales	1 1/2
9	1/2 lb. Bals. Gales	1 1/2
10	1/2 lb. Bals. Gales	1 1/2
11	1/2 lb. Bals. Gales	1 1/2
12	1/2 lb. Bals. Gales	1 1/2
13	1/2 lb. Bals. Gales	1 1/2
14	1/2 lb. Bals. Gales	1 1/2
15	1/2 lb. Bals. Gales	1 1/2
16	1/2 lb. Bals. Gales	1 1/2
17	1/2 lb. Bals. Gales	1 1/2
18	1/2 lb. Bals. Gales	1 1/2
19	1/2 lb. Bals. Gales	1 1/2
20	1/2 lb. Bals. Gales	1 1/2
21	1/2 lb. Bals. Gales	1 1/2
22	1/2 lb. Bals. Gales	1 1/2
23	1/2 lb. Bals. Gales	1 1/2
24	1/2 lb. Bals. Gales	1 1/2
25	1/2 lb. Bals. Gales	1 1/2
26	1/2 lb. Bals. Gales	1 1/2
27	1/2 lb. Bals. Gales	1 1/2
28	1/2 lb. Bals. Gales	1 1/2
29	1/2 lb. Bals. Gales	1 1/2
30	1/2 lb. Bals. Gales	1 1/2
31	1/2 lb. Bals. Gales	1 1/2
32	1/2 lb. Bals. Gales	1 1/2
33	1/2 lb. Bals. Gales	1 1/2
34	1/2 lb. Bals. Gales	1 1/2
35	1/2 lb. Bals. Gales	1 1/2
36	1/2 lb. Bals. Gales	1 1/2
37	1/2 lb. Bals. Gales	1 1/2
38	1/2 lb. Bals. Gales	1 1/2
39	1/2 lb. Bals. Gales	1 1/2
40	1/2 lb. Bals. Gales	1 1/2
41	1/2 lb. Bals. Gales	1 1/2
42	1/2 lb. Bals. Gales	1 1/2
43	1/2 lb. Bals. Gales	1 1/2
44	1/2 lb. Bals. Gales	1 1/2
45	1/2 lb. Bals. Gales	1 1/2
46	1/2 lb. Bals. Gales	1 1/2
47	1/2 lb. Bals. Gales	1 1/2
48	1/2 lb. Bals. Gales	1 1/2
49	1/2 lb. Bals. Gales	1 1/2
50	1/2 lb. Bals. Gales	1 1/2
51	1/2 lb. Bals. Gales	1 1/2
52	1/2 lb. Bals. Gales	1 1/2
53	1/2 lb. Bals. Gales	1 1/2
54	1/2 lb. Bals. Gales	1 1/2
55	1/2 lb. Bals. Gales	1 1/2
56	1/2 lb. Bals. Gales	1 1/2
57	1/2 lb. Bals. Gales	1 1/2
58	1/2 lb. Bals. Gales	1 1/2
59	1/2 lb. Bals. Gales	1 1/2
60	1/2 lb. Bals. Gales	1 1/2
61	1/2 lb. Bals. Gales	1 1/2
62	1/2 lb. Bals. Gales	1 1/2
63	1/2 lb. Bals. Gales	1 1/2
64	1/2 lb. Bals. Gales	1 1/2
65	1/2 lb. Bals. Gales	1 1/2
66	1/2 lb. Bals. Gales	1 1/2
67	1/2 lb. Bals. Gales	1 1/2
68	1/2 lb. Bals. Gales	1 1/2
69	1/2 lb. Bals. Gales	1 1/2
70	1/2 lb. Bals. Gales	1 1/2
71	1/2 lb. Bals. Gales	1 1/2
72	1/2 lb. Bals. Gales	1 1/2
73	1/2 lb. Bals. Gales	1 1/2
74	1/2 lb. Bals. Gales	1 1/2
75	1/2 lb. Bals. Gales	1 1/2
76	1/2 lb. Bals. Gales	1 1/2
77	1/2 lb. Bals. Gales	1 1/2
78	1/2 lb. Bals. Gales	1 1/2
79	1/2 lb. Bals. Gales	1 1/2
80	1/2 lb. Bals. Gales	1 1/2
81	1/2 lb. Bals. Gales	1 1/2
82	1/2 lb. Bals. Gales	1 1/2
83	1/2 lb. Bals. Gales	1 1/2
84	1/2 lb. Bals. Gales	1 1/2
85	1/2 lb. Bals. Gales	1 1/2
86	1/2 lb. Bals. Gales	1 1/2
87	1/2 lb. Bals. Gales	1 1/2
88	1/2 lb. Bals. Gales	1 1/2
89	1/2 lb. Bals. Gales	1 1/2
90	1/2 lb. Bals. Gales	1 1/2
91	1/2 lb. Bals. Gales	1 1/2
92	1/2 lb. Bals. Gales	1 1/2
93	1/2 lb. Bals. Gales	1 1/2
94	1/2 lb. Bals. Gales	1 1/2
95	1/2 lb. Bals. Gales	1 1/2
96	1/2 lb. Bals. Gales	1 1/2
97	1/2 lb. Bals. Gales	1 1/2
98	1/2 lb. Bals. Gales	1 1/2
99	1/2 lb. Bals. Gales	1 1/2
100	1/2 lb. Bals. Gales	1 1/2

Concerning it he writes: "The ancient copy sent you was taken from an old journal or ledger belonging to Frederick Miller, who kept a drug store in Hagerstown, Md., at that time. Some years later the first drug store was started in this place and some of the furnishings for it were bought in Hagerstown second hand, among them being a chest of drawers in one of which was this ledger. I still have the drawers and also ten 2½-gallon functure bottles, also several 6-quart functure bottles with the weight of bottle and stopper engraved on top, all of

which came from there, and are, I suppose, over a century old. It is quite interesting to look through the ledger, there being a great many receipts written in the back part of it."

WHO IS MR. SMITH?

New York, Jan. 2, 1898.

To the Editor.

What do you know about Mr. Geo. Drake Smith? Is he indorsed by the Kings County Pharmaceutical Association, or the German Apothecaries' Society of New York? I signed the agreement he presented some three months ago, seeing the signatures of several friends upon it. Afterwards I saw in your columns and elsewhere doubts thrown upon his statements as to the indorsement and also upon his proposed methods. I told his representative to-day that it looked very much to me like a patent medicine manufacturer undertaking to cure a disease with a secret nostrum. Who is Mr. Geo. Drake Smith? Can he give references as to previous cures of the body politic by his methods?

Where is his array of testimonials from (trade) invalids restored to financial health? By answering the above to the best of your ability you will oblige several brother pharmacists as well as, yours very respectfully,

THOMAS LATHAM.

(See Era, Dec. 2, page S41, for full account of Mr. Smith and his scheme.)

THIS IS THE MERCER CHEMICAL CO.

Jan. 7, 1898.

To the Editor.

I was much amused at the note of the Mercer Chemical Co., in the Era of the 16th ult., under the heading, "Not the Mercer Chemical Co." One would imagine that they feel much hurt at the insinuation that they sell direct to physicians, and solicit that kind of patronage. Now, in my opinion they have no cause to criticise any other house for selling to physicians, as they do in that letter. The reason I think so is best expressed in the enclosed advertisements clipped from the January Medical Brief. Consistency is a jewel too expensive for the Mercer Chemical Co., apparently.

One of the advertisements referred to above would render us liable to Anthony Comstock's censure, if published. The other follows:

"Dispensing Physicians can save money by dealing direct with the manufacturers. Why don't you make the profit now paid the middle men. Try us once and see what you save. We are the basis of supply. We not only sell, but manufacture ourselves everything in the pharmaceutical line. We give physicians forty per cent. discount from the usual list. Other houses give you twenty-five per cent. We deliver freight orders for pharmaceuticals free of charge. Goods guaranteed. Catalogue on request. The Mercer Chemical Co., Omaha, Neb. See also page 152.

HEAT OF THE SUN.—Scientists rarely agree in their estimate of the probable heat of the sun, though it appears that the same opinion on this point is shared by Prof. Langley and Lord Kelvin, whose calculations fix the temperature of that luminary at about 8,000° Centigrade. They arrived at this result from figures based on solar photospheres. The eminent Italian astronomer and mathematician, Secchi, gave it as his opinion that the temperature could be but little, if any, short of 10,000,000° Centigrade; Spörer thought it might be 37,000°, while Pouillet brought it down to somewhere between 1,400° and 1,800° of the same scale. M. Becquerel's opinion was in substantial agreement with that of Prof. Langley. Again, M. St. Clair Deville declares that the heat of the solar surface does not give evidence of being in excess of 2,800°—this conclusion being in accordance, also, with the conclusions arrived at by Hansen and Delany. But Sir Robert Ball, professor of astronomy at Cambridge, England, is quoted as rating the effective temperature of the sun as probably 18,000°.—(Sci. Am.)

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Cohenz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Albert E. Ebert, Ph.M., Ph.D.	Charles W. Parsons, Ph.C.
James M. Good, Ph.G., M.D.	Edgar L. Patch, Ph.G.
Arthur L. Green, M.D., Ph.D., Ph.C.	George F. Payne, Ph.G., M.D.
Charles F. Heebner, Ph.M.B., Ph.G.	T. D. Reed, M.D., C.M.
George B. Kauffman, B.Sc., Ph.D.	Edsel A. Ruddiman, Ph.M., M.D.
E. J. Kennedy, Ph. C.	Henry H. Rusby, M. D.
Henry Kraemer, Ph.G., Ph.D.	Otto Sahli, A.M.
Edward Kremers, Ph.G., Ph.D.	L. E. Sayre, B.S., Ph.M.
	Wilbur L. Scoville, Ph.G.
	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Otto A. Wall, Ph.G., M.D.
	Frederick J. Wulling, Ph.G.,

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed. FEES. The entire expense is only \$7.75 per annum and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 35.

Inorganic Chemistry.

Silicon, Germanium, Tin.

SILICON.

Symbol Si. Valence 4. Atomic Weight 28.3. Specific Gravity 2.49.

Historical.—The element was first isolated in an impure state by the Swedish chemist, Berzelius, in 1810, and in the pure form by the same chemist, in 1823. The name is derived from *silex*, the Latin name for flint, in allusion to its principal natural compound.

Natural Occurrence.—Next to oxygen, silicon is the most abundant element on the earth, and is estimated to make up no less than 27 per cent. of the entire weight of the globe, exclusive of the atmosphere. Its most abundant compound is the dioxid, SiO_2 , which constitutes the bulk of the rocks of the granitic series, and, combined with metallic elements is found in a vast number of silicates, as feldspar, clay, mica, talc, hornblende, garnet, etc.

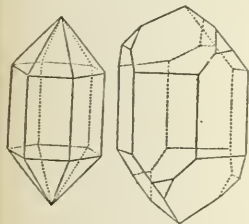
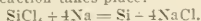


Fig. 39.—Crystals of Silicon Dioxid, or Quartz.

In the purest form silicon dioxid is known as quartz or rock crystal. (Fig. 39.) Less transparent varieties are known as milky quartz, rose quartz, topaz, etc. The transparent variety when colored violet or bluish is called amethyst. When in rock form, consisting of fine grains cemented together, it is known as sandstone, and when unconsolidated as sand.

In the cryptocrystalline or microcrystalline form it occurs as flint, chalcedony, carnelian, agate, etc.

Preparation.—The element can be obtained in the free state by decomposing the tetrachlorid, SiCl_4 , by passing its vapor over heated metallic sodium or potassium, when the following reaction takes place:

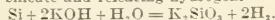


It can also be prepared by fusing an alkaline fluosilicate, as Na_2SiF_6 , with metallic aluminum, when the

aluminum combines with the fluorin while the silicon dissolves in the melted metal and separates out in crystals as the latter solidifies. Other metals and reducing agents may be used instead of aluminum.

Description and Physical Properties.—As prepared by reduction of the tetrachlorid with sodium or potassium the element is in the form of an amorphous, dark brown powder, and is a non-conductor of electricity. When prepared by reducing a fluosilicate with aluminum, zinc or iron, the silicon separates out in the form of dark gray crystals possessing a luster like graphite, and is known as *graphitoid* silicon. In this form it is a conductor of electricity, and has a specific gravity of 2.49.

Chemical Properties.—The amorphous variety when heated in the air ignites and burns to form the dioxid. The crystalline variety does not ignite in the air, and at a white heat fuses and can be cast into sticks. The free element is practically unaffected by ordinary mineral acids. The amorphous variety is dissolved by hydrofluoric acid and the crystalline variety by a mixture of hydrofluoric and nitric acids. When strongly heated in oxygen it oxidizes only slightly, but when heated in an atmosphere of carbon dioxid, it burns to form the dioxid, while the carbon is reduced to the monoxid. Hot, concentrated solutions of the alkaline hydrates dissolve the element forming a silicate and releasing hydrogen.



COMPOUNDS OF SILICON.

Hydrogen Compounds.—With hydrogen silicon forms one compound *silicon hydride*, SiH_4 , also called silico-methane from the resemblance of its formula to that of the corresponding carbon compound.

It may be prepared by decomposing magnesium silicid with hydrochloric acid. As thus produced it is a colorless gas, which, like the corresponding compound of hydrogen and phosphorus, phosphin, takes fire spontaneously, when permitted to bubble through water into the air, each burst of flame being followed by a ring of smoke consisting of finely divided silica.

Halogen Compounds.—With the halogens, silicon can be caused to form indirectly a series of compounds resembling the corresponding compounds of carbon. Thus we

have a tetrachlorid, SiCl_4 , an acid, colorless liquid, fuming a moist air; a tetrabromid, SiBr_4 , a tetraiodid, SiI_4 , and a tetrafluorid, SiF_4 . There are also substitution compounds of silicon hydrid and the halogens, such as silico-chloroform, SiHCl_3 , silico-bromoform, SiHBr_3 , silico-iodoform, SiHI_3 , etc.

Other halogen compounds and derivatives are also known.

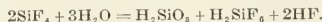
Oxygen Compounds.—Silicon forms only one known compound with oxygen, the dioxid, SiO_2 , or silica, previously described as the principal natural compound of the element. In addition to the forms already mentioned, it exists in extensive deposits of a fine powdery nature known as tripoli or kieselguhr, and consisting almost exclusively of the remains of microscopic vegetable forms known as diatoms. It also exists in the polished surface of the grasses, bamboo, scouring rush, and in the hairs and feathers of animals and birds.

Silica is insoluble in all acids except hydrofluoric. The amorphous varieties are soluble in solutions of the alkalis. The crystalline are less soluble, or insoluble, but when fused with the alkaline hydrates or carbonates combine with them to form soluble silicates, commonly known as "soluble glass."

Silicon dioxid, or silica, is an acid anhydrid corresponding to carbon dioxid. Combined with one molecule of water it forms metasilicic acid, H_2SiO_3 , or with two molecules, orthosilicic, H_4SiO_4 . These acids cannot be formed directly from the dioxid, but may be prepared by decomposing their soluble alkaline salts with a mineral acid. They cannot be obtained except in solution, and when evaporated split up into the dioxid and water.

The *Liquor Sodii Silicatis* of the Pharmacopœia consists mainly of an aqueous solution of sodium meta-silicate, and is sold under the common trade name of soluble glass. When hydrochloric acid is added to a moderately concentrated solution, a dense, jelly-like precipitate of metasilicic acid separates, and this on drying leaves an amorphous powder of silica.

Fluosilicic Acid, H_2SiF_6 . is formed along with metasilicic acid when silicon tetrafluorid is decomposed by water, thus—



It corresponds to meta-silicic acid in which the three oxygen atoms have been replaced by six of fluorin. It is known only in solution, and on attempts at concentration decomposes into the tetrafluorid and hydrofluoric acid.

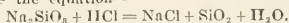
In addition to those already named, other acids of silicon and other silicates exist, but they are for the most part of complex formation, and of scientific importance only.

PRACTICAL STUDIES.

1. Dilute some sodium silicate or soluble glass with an equal volume of water. Place in an evaporating dish and add some hydrochloric acid. What is the result?

2. Break up the gelatinous precipitate with a glass rod, and evaporate to dryness. Again acidulate the mass with hydrochloric acid, and again evaporate to complete dryness. Wash the dry residue several times with water and evaporate the washings in another dish to dryness. Examine the insoluble residue in the first dish, and the crystalline residue in the second. What are they?

Balance the equation—



GERMANIUM.

Symbol Ge. Valence 2 and 4. Atomic Weight 72.3. Specific Gravity 5.47.

Historical.—Germanium was discovered in 1886 by the German chemist Clemens Winckler, in an ore of silver termed argyrodite. A remarkable fact in connection with the history of this element is that its existence had previously been predicted by Mendeleef from theoretical

considerations, based upon the classification of the elements according to the so-called periodic system.

The name of the element was adopted in honor of the country of the chemist who discovered it.

Natural Occurrence.—Germanium is a very rare element. It occurs in argyrodite, which is a double sulfid of germanium and silver, having the composition $3\text{Ag}_2\text{S} \cdot \text{GeS}_2$, and is also found in combination with arsenic and antimony.

Preparation.—By a somewhat complicated process it is freed from the accompanying metals and converted to the sulfid. This is then converted into the oxid, either by roasting or by treatment with nitric acid, and the metal obtained by reducing the oxid by heating with charcoal, or by heating to redness in a current of hydrogen.

Description and Physical Properties.—Germanium is a white, brittle metal, somewhat resembling arsenic, but more metallic in its properties, and possessing a brilliant luster. Like carbon and silicon, it crystallizes in the regular system. It is neither malleable nor ductile, and can readily be reduced to powder. The specific gravity is 5.47, and the melting point 954°C .

Chemical Properties.—The metal is permanent in air at ordinary temperatures, but above the fusing point combines with oxygen to form the dioxid. It is insoluble in hydrochloric and dilute sulfuric acids. Hot, concentrated sulfuric acid dissolves it, forming the sulfate. By nitric and nitrohydrochloric acids it is converted to the dioxid, GeO_2 .

COMPOUNDS OF GERMANIUM.

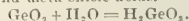
Germanium forms two classes of compounds, germanic and germanous. In general, germanous compounds exhibit a strong tendency to pass into germanic, and hence are reducing agents of considerable power. As might be expected from its higher atomic weight and more pronounced metallic character, it does not unite with hydrogen like the first two members of the group.

Halogen Compounds.—With each of the halogens germanium combines to form a tetra halid. The tetrachlorid, or germanic chlorid, GeCl_4 , is a colorless, volatile liquid, decomposed by water, and closely resembling the tetrachlorids of carbon and silicon. The tetra-bromid, tetra-iodid, and tetra-fluorid also, in general, resemble the corresponding compounds of carbon and silicon. A germanous chlorid, GeCl_3 , is also known.

Though germanium will not unite directly with hydrogen, it can be caused to combine indirectly so as to form several halogen derivatives of a hypothetical germanic hydrid, GeH_4 . One of these is a germanium chloroform, GeHCl_3 , a colorless, volatile liquid, decomposed by contact with water.

Oxygen Compounds.—Germanium forms two oxids, germanic or dioxid, GeO_2 , and germanous or monoxid, GeO .

Germanic oxid is formed when the metal is burned in the air, or is oxidized by nitric or nitrohydrochloric acid. It is weakly acidic and dissolves in water to form germanic or meta-germanic acid, H_2GeO_3 , corresponding to meta-carbonic and meta-silicic acids.



Germanous oxid is formed by precipitating a solution of germanous chlorid by potassic hydrate. It has feeble basic properties. It oxidizes readily to form the dioxid and is therefore a strong reducing agent.

Sulfur Compounds.—Germanium forms two sulfids, germanic and germanous. Germanic sulfid, GeS_2 , is formed as a white precipitate when a current of hydrogen sulfid is passed through a solution containing a germanic salt, strongly acidulated with hydrochloric acid. Like the sulfids of arsenic and antimony, it dissolves in an alkaline sulfid to form a sulfo-salt, and is therefore an acidic anhydrid.

Germanous sulfid, GeS , may be formed by reducing the disulfid in a current of hydrogen, or by precipitating a solution of germanous chlorid with hydrogen sulfid. It is in the form of a reddish brown powder.

TIN.

Symbol Sn. Valence 2 and 4. Atomic Weight 118.8
Specific Gravity 7.3.

Historical.—Tin was one of the earliest metals known, and before the Christian Era was carried from the British Isles to Italy. For a long time it was looked upon as a variety of lead, and was so regarded by Pliny, who called it *plumbum candidum*, to distinguish it from lead proper which he termed *plumbum nigrum*. By the same writer the word *stannum* was applied to any mixture of metals one of which was lead, and only came to be applied specifically to tin at a much later date.

Natural Occurrences.—Tin probably occurs in the native state in very small quantities, but is principally found as the dioxide, known as *astinstone*, or to mineralogists as *castite*. The crystallized oxide is frequently found in the beds of streams and is known as *stream tin*, and that which is found in crystalline rocks as *vein* or *mine tin*.

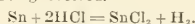
Preparation.—The crushed ore is roasted to remove sulfur and arsenic, washed, and mixed with charcoal or anthracite and heated in a reverberatory furnace. The carbon at high temperatures having greater affinity for oxygen than for the metal, combines with it and passes off as carbon dioxide, leaving the metal behind. The tin thus produced contains considerable quantities of other metals as impurities. These can be partially removed by a process of *liquation*, which consists in gradually heating the mass to the fusing point of the tin, which is then drawn off from its less fusible alloys with iron and arsenic.

Description and Physical Properties.—Tin is a lustrous, white metal, of a hardness between lead and gold. It is malleable and can be rolled or hammered into thin foil. At 100° C. it can be drawn into tolerably fine wire. At 200° C. it becomes brittle and can be powdered in a mortar. When bent it emits a peculiar rustling sound known as the "Tin cry," due to the friction of the particles of metal as they glide over each other. The fracture is fibrous. The specific gravity is 7.3, and the melting point 228° C. At a white heat it volatilizes.

Two modifications of tin are known, the crystalline and amorphous. The crystalline variety is most common, the crystals being either rhombic or tetragonal. The amorphous variety is produced by cooling block tin to or below the freezing point of mercury, or even by permitting block tin to remain untouched for a long time. It is a

grayish, non-crystalline powder, and reassumes its metallic appearance only after remelting.

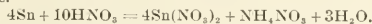
Chemical Properties.—Tin is nearly permanent in dry air. It dissolves in hydrochloric acid to form stannous chloride, hydrogen being evolved.



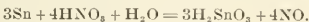
Hot and concentrated sulfuric acid dissolves it, forming stannous sulfate, part of the acid being reduced to sulfur dioxide.



Cold, dilute nitric acid dissolves tin to form stannous nitrate, ammonium nitrate being produced at the same time.



If the acid be hot and concentrated the tin is oxidized to stannic acid, H_2SnO_4 , while the acid is reduced to nitric acid.



The metal is but little affected by organic acids, and is hence a valuable material for vessels intended for culinary purposes.

Uses.—The principal use of tin in the metallic state is in the formation of its alloys, and as a protective covering for more readily oxidizable metals, as copper and iron. The layer is applied simply by dipping the perfectly clean article to be tinned into a bath of the molten metal one or more times. Tin uncombined with other metals is known as block tin, and is much used for pipes and linings in soda fountains, for condensers, etc., where ordinary metals would be subject to corrosion.

Alloys.—Tin forms with the other metals a number of very valuable alloys, some of which have been known and used for centuries. The substance known as *pewter* is an alloy of 4 of tin to 1 of lead. By increasing the proportion of lead, solder is formed. The alloys of these two metals are harder, tougher and more fusible than either taken separately. *Bronze* is an alloy of copper and tin, and usually containing zinc. *Gun-metal* consists of 9 parts of copper to 1 of tin, *bell-metal* of 4 to 5 of copper to 1 of tin. *Phosphor bronze* contains a small quantity of phosphorus, which renders the alloy more homogeneous, as well as harder and tougher. With mercury tin unites readily, forming an alloy which is liquid or solid according to the proportions employed. Any alloy which contains mercury is usually termed an *amalgam* .

A SIMPLE REGIMEN FOR OBESE PERSONS.—Dr. Cathell reports that he has had more than ordinary success during several years with a plan of treatment outlined below. In his view, obesity is due to one or more of the following causes: Congenitally small lungs with a defective oxygenating capacity; eating excessively of all kinds of food; want of lung-expanding exercise; using alcoholic drinks to excess. Many of the drugs which have a known fat-reducing power exert an injurious action on the other tissues of the body, and if used persistently for any length of time, or in efficient doses become dangerous to health. While the various obesity cures are so rigorous that few carry them out conscientiously, the treatment of the author is very simple. The patient has only to drink after each meal a glass of the artificial Kissinger water to be found at drug stores and soda-water fountains, and on the succeeding day, a glass of artificial Vichy water also half an hour after each meal. This is to be continued week after week until the patient comes down to a normal degree of stoutness, and the waters are then discontinued. While taking the waters the person should keep a weekly record of his weight, always using the same scales, and wearing the same clothing, and should also, for his own satisfaction, record his chest, waist and hip measurements. If the loss in weight exceeds two pounds a week, the amount of each water should be made smaller; and if

the loss has not equalled two pounds a week, a few teaspoonfuls of lemon juice should be added to each glass of the Kissinger water to increase its acidity, and a teaspoonful of aromatic spirits of ammonia to the Vichy to increase its alkalinity. The diet should be light and contain only small amounts of fat, starch, sugar, and alcohol. Moderate outdoor exercise should be included in the day's programme. The mode of action of these waters taken in the manner described, is not clear, but their efficiency is too well established to admit of doubt.—Maryland Med. Jour.

SOLUTION OF PROTARGOL.—The following directions are given to prepare a perfect solution without heat: Place 1 Gm. of glycerin in a porcelain dish, upon this 1 Gm. of protargol, and rub them well together with a pestle. Wash the mixture into a bottle with cold water and fill up to the desired volume. (Ph. Ztg.)

METRITIS.—Ichthol is employed as an ointment, according to the following formula: Ichthol, 10 parts; lanoline, 40 parts; opium, 1 part; vaseline, 10 parts.—International Med. Annual.

IODOFORM BOUGIES.—Iodoform, 5 Gm., gum arabic, 2.5 Gm.; mucilage of gum arabic and glycerin, equal parts, a sufficient quantity.

LECTURE No. 36.

Botany.

By PROF. HENRY KRAEMER, Ph. G., Ph. D.

Outer Morphology.

VEGETATIVE ELEMENTS.

By the term vegetative elements is meant those that are concerned in the manufacture and transportation of the food of the plant. They are, viz.: Root, stem and leaf.

Root.—If we take the seed of a pea and put it in a little soil in the earth, or in a box containing some earth, or sawdust or shavings, and give it plenty of air and moisture so that it will grow, there is soon produced an element which invariably goes down into the earth or sawdust. "It loves the abode of darkness (apparently) rather than light." It persists in this course toward the center of the earth no matter in which position the seed may be placed. Even after it has started its growth downward, it may be removed from the loose earth or sawdust and pinned to a cork in a moist chamber with this portion directed sidewise (Fig. 1 A),

Two germinating plants of pea, which are pierced through one of their cotyledons and attached to a cork in a moist chamber. The latter may be made by taking a large white-glass acid bottle and removing the bottom and placing it over a dish or plate containing water.

and it will be found in a few days that the apex is again directed downward (Fig. 1 B). This element is called

the root. This one quality that distinguishes the root from the other elements of the plant is called *positive geotropism*. It is interesting further to take a young germinating plantlet (as Fig. 1 A) and divide the root by use of a fine pen and India ink into ten equal divisions (Fig. 2) and attach it as before by means of a pin to a cork in a moist chamber. In the course of one to two days it is apparent that the marks between 1 and 5 have become much further apart and that the growth in this region is

Germinating plant of pea divided at the top by means of India ink into ten equal divisions.

about three times that between 5 and 10 (Fig. 3). This experiment indicates that the growth in length of the root is confined to the apex thereof. Hence, in addition to the root showing positive geotropism we find that it possesses the point of growth or point of vegetation near the apex.

Upon examining the tip of the root (especially when grown in sawdust or shavings) with a magnifying glass

there is found a little cap covering the tip. This is called the *root cap* (Fig. 4). The latter is being continually worn away as the root penetrates the soil, and its function is to protect the growing point which is situated a little behind the root-cap. The root in most cases produces branches; these arise from within the root. The first indication of branches is from within and not without. The significance of this we shall see later.

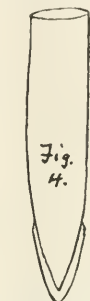
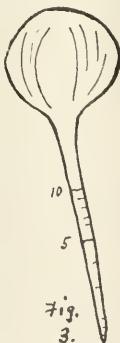


Diagram of root with root-cap.

When the germinating root persists and continues its growth, it is called the *main* or *tap*, *root* or *primary* root. The branches thereof are spoken of as being side roots or root branches (Fig. 5). Whatever has been said regarding the primary root applies equally to the side roots, i. e. (1) they possess positive geotropism; (2) the point of growth is near the apex; (3) the point of growth is protected by a root cap.



Plant marked as Fig. 2 after one or two days of further growth. Showing that the growth in length of the root is confined to the apex thereof.



Lower portion of plant of morning glory. (r) primary or tap root; (rb) side roots or root-branches; (p) tip of primary root; (g) germinating or seed leaves; (s) stem; (sb) stem-branch; (f) foliage leaf.

Both the primary root and its branches produce either just back of or some distance behind the root-cap a development of fine silky hairs. These are appreciable to the naked eye and may easily be observed in seeds of peas sown in "excelsior" or shavings. These are the *root-hairs* (Fig. 6). Their function is twofold: To secrete an acid to render the insoluble inorganic substances of the earth soluble and to take the dissolved substances into the plant. That these root-hairs are acid may be easily demonstrated by the hairs turning blue litmus paper red. A very common experiment that is used to show the part that this acid sap plays in the life of the plant, is to take a polished piece of marble and put it in the bottom of a flower-pot in which any ordinary plant may be sown and allowed to grow. The roots penetrate the soil until they reach the marble and then they grow along its surface and corrode it wherever they come in contact

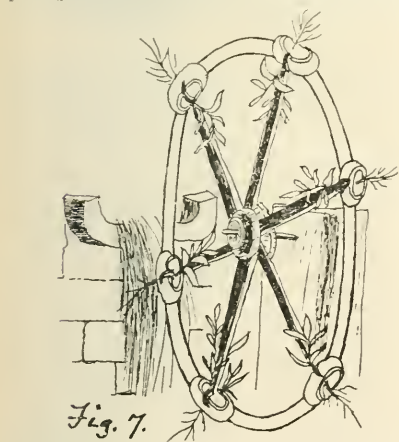
with it. This corrosion means that the acid from the root-hairs has interacted with the marble (limestone) and produced a soluble compound which is used by the plant.

Stem.—If we continue our observations on the germinating pea plant we see another element developing. This, on the contrary,

seeks the light, and its direction of growth is directly opposite from that of the root. Further, if we perform similar experiments as those already alluded to under the root (Fig. 1), we will observe that no matter what may be the position of the seed originally or what position this element may be placed in, it will subsequently grow away from the center of the earth. It is negative in what the root is positive. That is, just as the root shows positive geotropism so this element tends to negative geotropism. This element is called the stem. The direction of growth of root and stem is not a merely accidental one. A number of investigators have been at work to see what is the cause of this diametrically opposed growth in stem and root. "It has been suggested

seeds, and holding little troughs full of mould open on two sides (Fig. 7); the wheel being put in motion in a vertical direction by a current of water, and made to describe many revolutions in a minute. In consequence of this rotary movement, producing the particular force known in mechanics as centrifugal force, the action of gravitation is as it were annihilated, and the sprouting seed removed from its influence, is subjected to centrifugal force only. See what occurs: The small stems which, in ordinary circumstances, would be directed upwards, that is to say, in a direction opposite to the action of gravitation, now turn themselves in the direction opposite to the direction of the centrifugal force, or toward the center of the wheel. The rootlets which, under ordinary circumstances, would bury themselves in the earth, and in the direction required by the laws of gravitation, in reality now point in the direction of the force which has taken the place of gravitation.

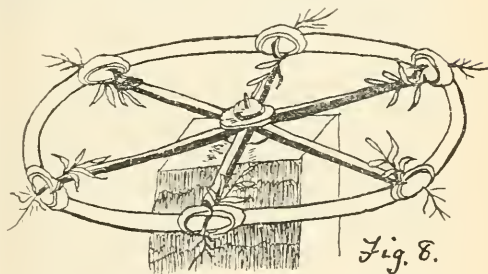
This curious experiment, carried out for the first time by J. A. Knight, of England, has been repeated and modified in France by the ingenious naturalist, Dutrochet. He replaced the vertical wheel by a horizontal one (Fig. 8). The force of gravitation acts constantly on the same points of the germinating seed; but as this seed is exposed at the same time to the action of centrifugal force, produced by the movement of the wheel, the roots follow an intermediate direction between a vertical one, which would be determined by the force of gravitation and a horizontal one, resulting from centrifugal



Knight's Wheel Experiment on germinating plants. The latter are freed from the action of gravitation, and are subjected to that of centrifugal force only.

that the action of gravitation would take some part in "the guidance of the roots." This is, in fact, the apparent tendency of the following experiments:

Beans have been made to germinate when placed on the circumference of an iron or wooden wheel surrounded with moss so as to maintain the moisture of the



Dutrochet's Wheel Experiment. Similar to that of Knight's, but the vertical wheel replaced by a horizontal one. Both the force of gravity and centrifugal force act on the germinating seed. The root is strongly influenced by the former. (See text.)

force. As the movement communicated to the wheel is increased in rapidity, the angle made by the root with the plane of the wheel becomes more acute also. When this angle becomes nothing the root is horizontal. The influence of gravitation in directing the course of the root is put beyond doubt by these curious experiments (Figures). We therefore speak of the root as showing *positive geotropism*, i. e., as growing in the direction of the force of gravity, and the stem as showing *negative geotropism*, i. e., opposed to the force of gravity.

The stem, like the root, has a point of growth near the apex, but, much unlike the root, this point is not protected by a covering corresponding to the root. Its only protection are other additional elements which we shall consider later. The stem serves as a bearer of the other members of the plant that grow in the air, viz., leaves, flowers and their products. The stem is characterized as: (1) manifesting negative geotropism; (2) having its point of vegetation protected by other additional elements; (3) not possessing root-hairs or root-cap.

Leaf—The lateral productions on the main stem or its branches that are to be distinguished generally from these by being thin, outspreading and possessing a green color are called *leaves*. The direction of their growth is not influenced by gravity, so we do not speak of them as manifesting either positive or negative geotropism.

We have here to deal with an entirely different influence, viz., light. The leaf position, on the other hand, is a fixed one with reference to light rays. As a rule the upper surface of the leaf is in a position that is perpendicular, not to the rays from direct sunlight, but to the influence of the brightest diffuse daylight. Weisner has shown, for instance, that when plants are so situated that they receive direct sunlight only for a time in the morning and diffuse daylight during the rest of the day, the position of the upper surface is perpendicular to the incident rays of the daylight and not to that of the rays of the morning sun. This phenomenon may be studied in any of the window plants so extensively cultivated, as geraniums, etc. We speak of the leaf as showing *transverse heliotropism*. The leaf grows very differently from the stem. The point of growth is situated at the base and not the apex as in root and stem.

These are then the important morphological distinctions between root, stem and leaf:

VEGETATIVE ELEMENTS.

ROOT.	STEM.	LEAF.
1. More or less cylindrical.	More or less cylindrical.	Thin outspreading.
2. Not green.	May be green.	Green.
3. Positive geotropism.	Negative geotropism.	Transverse heliotropism.
4. Point of growth near the apex.	Point of growth near apex.	Point of growth near the base.
5. Point of growth protected, by root-cap.	Point of growth not protected as root.	Point of growth under tissues cut off.
6. Never bears leaves.	Normally carries leaves.	

MODIFICATIONS OF THE TYPICAL VEGETATIVE ELEMENTS.

Modification in Root.—(1) *Root Thorns*.—These three elements are not infrequently transformed or metamorphosed for some biological reason. For, instance, in some palms (Acanthoriza) the roots penetrate the earth for a time, but some of them manifest negative geotropism, like the stem, and come out of the earth to a height of a foot or more. The apex becomes indurated and needle like. When one observes such a curious de-



Lower portion of a Sweet-potato plant. (s) overground creeping stem; (f) more or less erect stem; (f) foliage leaf; (r) root; (rc) root-branch charged with nutriment forming a "tuberous root" or "root-tuber;" (rb) branch roots of the tuberous root.

velopment around a palm, one cannot help but come to the conclusion that these sharp-pointed roots serve the

plant the same purpose as a barbed wire fence around a human dwelling, i. e., to keep intruders off. Such roots are spoken of as *Root Thorns*.

(2) *Tuberous Roots*.—There are some plants that use their roots as storehouses for nutriment, as jalap, sweet-potato (Fig. 9), beet, etc. They are thick and fleshy and called *tuberous roots* or *root tubers*. The forms of these roots are various and hence a number of names have been used to indicate their shape, e. g.,

Fusiform, as ginseng, parsnip, etc.,

Conical, as carrot, etc.

Napiform, as jalap, turnip, etc.

(3) *Aerial and Adventitious Roots*.—There are some plants like the mangrove (of our Southern States) and the banyan (of India, so famous and pictured in almost all of the school books as being able to encompass in its shade an army) which attain their extensive area by a very peculiar device. Some of the branches are in the nature of roots, they manifest a positive geotropism, and while at first they swing in the air, they finally reach the ground, penetrate into the soil and serve to support the massive branches. Such roots are spoken of as *aerial roots*, because they are first produced in the open air. They are sometimes spoken of as being *adventitious roots* because they do not arise from that portion of the stem which is immediately connected with the ground. Aerial roots such as those of the banyan tree or even those produced in ordinary corn plants (Fig. 10) from the lower portions, serve essentially as mechanical supports although they also perform the function of roots. In fact, they may altogether replace the primary or tap-root.

In the European Ivy (*Hedera Helix* Linné) aerial roots are produced for the purpose of assisting the plant to climb up walls or trees, etc.

(4) *Cypress-Knees*.—In the Bald Cypress (*Taxodium distichum* Rich.) of the Southern States, we have a very peculiar development when the plant grows in wet places. These developments are termed "knees" or "Cypress knees," and the name well expresses the product. The roots when growing in wet places manifest the production of a knee-like joint. The form of the root-branches is that of an inverted V. They may exercise a mechanical influence to support the tree, but it may be also to allow the roots to obtain more air. It seems singular that the Bald Cypress does not produce knees in dry soil and always does so when the roots are submerged. It is further singular that full-grown trees that have masses of knees surrounding them are lost when the soil in which they live has been drained. Whatever the function, be it to furnish air to the plant or to serve as a mechanical support to the tree under these conditions, this development only takes place under these peculiar conditions, i. e., when the roots grow in wet places.

(5) *Parasites and Saprophytes*.—There are further plants which produce elements corresponding to roots, but they penetrate the tissues of other plants in order to secure their nourishment. These rootlike elements are called *haustoria*. There are two classes of plants



Lower portion of Indian corn plant. (a) aerial roots produced at one of the lower joints; (b) aerial roots that have reached the soil and are producing branches.

which possess *Haustoria*, viz.: (1) Those that are *true parasites* or *green parasites*, in that they take up only the crude materials which the roots of the host plant have absorbed; and, (2) *Saprophytes*, which do not accept crude materials from the host, but take the digested or elaborated food materials only.

As an example of a *true parasite* we have the *Mistletoe* (coming from two Greek words meaning a thief on a tree) which live on oaks, elms, apples, etc.

Among *Saprophytes* we mention the common *Dodder* (*Cuscuta*) which lives on a great many different plants, as species of *Linum*, *Polygonum*, *Compositae*, *Leguminosae*, etc. Each species of *Dodder* has its particular host on which it lives. They "are among the most troublesome of parasitic weeds to the gardener and farmer in the Old World. Some of the species have become so destructive in French agriculture and horticulture, that the Prefect of one of the large provinces, *Charente-Inférieure*, has issued instructions, which are circulated freely among cultivators, making it obligatory on every one to destroy the plants wherever seen. The mandate is accompanied by descriptions by which the cultivators may know the pests as soon as they have begun their growth. It is remarkable that the plant is an annual and commences its growth by seed in the ground as ordinary plants do; but after they find something to attach themselves to, they draw their sustenance from the host plant, and then the connection between the plant and the soil dries up; the plant is completely severed from its terrestrial connections."

(G) *Orchids*.—Here is further a class of plants that is very interesting because of their remarkable flowers.

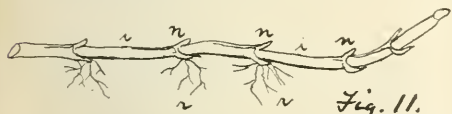


Fig. 11.

A part of one of the lower stem branches of peppermint (*Mentha piperita*) that moves along just below the surface of the earth. (n) nodes or joints from which rudimentary leaves arise; (i) internodes, i. e., portions of the stem between the nodes; (r) roots which emanate from the lower surface.

They are the orchids. They are most prized and cultivated by the wealthy as they are as a rule very expensive. These attach themselves to other plants, but do not derive their sustenance from the sap thereof. They have roots of their own which, though aerial, may penetrate the soil and obtain nourishment for the plant. The plant which yields the vanilla bean of commerce is an example. The bean of commerce is the fruit of several species of vanilla. The true Mexican vanilla is the product of *Vanilla planifolia*, a tall climber with green stems and producing white aerial roots opposite to the leaves. It grows on the Mexican red cedar, one of the most abundant trees of the vanilla forests of Mexico. It is grown from cuttings generally, much the same as grape vines. "Four or five years after the vine is planted, and sometimes before that period, its base roots at some distance, and before this occurs rootlets from above that portion which is dying have already grown and descended along the tree to get nourishment from the earth."

The Stem.—(1) *Prostrate Stems*.—Now the stem, like the root, does not always possess the typical characteristics given. While most stems attain a more or less erect position, there are others which bend over to one side, as *Stellaria humifusa* (a chickweed) or several of the "Bedstraws" or "Cleavers" (being species of *Galium*). There are some that lie prostrate on the ground, as "foetid currant" (*Ribes prostratum*). Some stems run along the ground, and from the nodes roots are produced as in strawberry *Mentha piperita* (Fig. 11). There are still many other forms; the terms describing these are used more especially in the study of Systematic Botany.

(2) *Rhizomes*.—There are stems that grow underneath the surface of the earth and were taken at one time for roots and called "creeping roots," etc. These underground products produce leaves and hence show their outer morphology. They are called *Rhizomes* or *Rootstocks*. In some cases they are of the ordinary thickness of the overground stem as in couch-grass (*Tritium repens* L., Fig. 12), and Peppermint (*Mentha piperita* Linné, Fig. 11), etc. Such plants move along near the



Fig. 12.

Specimen of Couch-Grass, or *Tritium*, showing (rh) underground stem or rhizome; (o) overground stem with (l) leaves; (r) roots arising from the nodes of the underground stem.

surface of the earth or underneath and strike root at each joint, consequently there are as many individuals practically as there are joints, and it is wellnigh impossible to eradicate a plant like *Tritium* when it once gets started in a field. In the State of Minnesota it is declared as one of the noxious weeds and it is unlawful to permit or suffer it to grow.



Fig. 13.

Underground stem or rhizome of *Podophyllum*. (rh) underground stem; (s) scar of overground stem; (b) bud; (r) roots arising from underground stem.

Most of the underground stems, (Rhizomes) of medicine (Fig. 13) are perceptibly thickened and more or less fleshy when fresh. They are storehouses of nutriment

provided by the plant during the summer for its development the following spring. This nutriment is further protected by the plant producing in many cases active poisonous principles. Hence there are a great many



Fig. 14.
Growing end of rhizome of Podophyllum showing forking of underground stem, and one means of reproduction, viz., the asexual, called propagation.

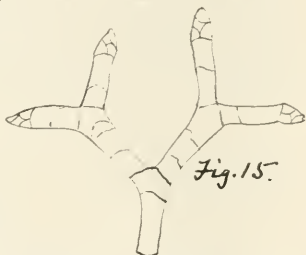


Fig. 15.
The product of another year's growth added to Fig. 14, showing how the plant travels.

rhizomes used in medicine. We might mention Ginger, Galangal, Convallaria, Podophyllum (Figs. 13, 14, 15), Sanguinaria, etc.

(3) *Tuber*.—There are some rhizomes in which a number of joints are very much thickened, giving one the idea of a swelling, as in the ordinary white potato (Fig. 16). Such a thickened underground stem is called a

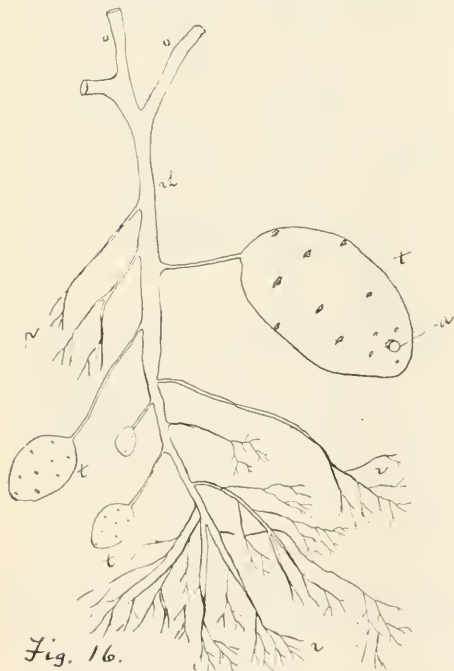


Fig. 16.

Lower portion of plant of potato. (a) portions of over ground stem; (rh) underground stem, portions of which are surcharged with nutriment and produce the "potato tuber" (t); (r) roots. The eyes of the potato tuber represent the nodes; (a) is the terminal bud.

Tuber, from the Latin *turnere*, to swell. The eyes represent the joints or *nodes* from which leaves may arise. It must be remembered that the sweet potato (Fig. 9), and Jalap were swollen roots and called tuberous roots. The difference then between a tuberous root and a tuber

is that the former, or its morphology, is a root, whereas the latter is a modified stem. The portion of the stem from which leaves arise is called a *node* and the distance between two nodes is termed an *internode*.

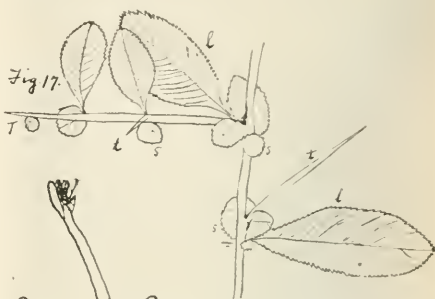


Fig. 17.
Portion of branch of the Japanese quince (*Cydonia Japonica*). (l) Lamina, or blade of leaf; (s) stipule of leaf; (t) branches modified to thorns; (r) branch thorn producing foliage.

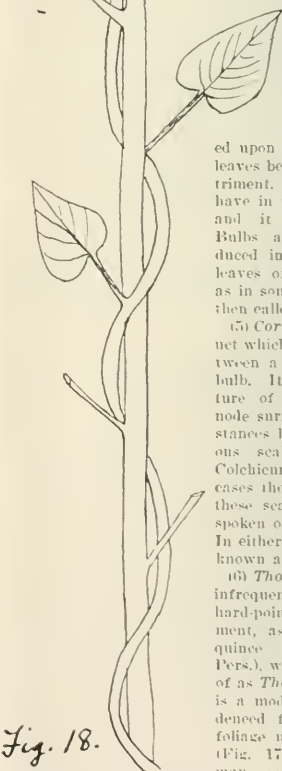


Fig. 18.

End of a twining stem of Morning Glory. The coiling is from left to right. The opposite of what occurs in the Hop.

(4) *Bulb*.—Now, instead of either the node or internode, or both, becoming excessively thickened, they may be reduced in size, i. e., crowded

upon each other and the leaves become filled with nutriment. Such a product we have in the onion or garlic, and it is called a *Bulb*. Bulbs are sometimes produced in the axil of the leaves of overground stem, as in some lilies. These are then called *Bulblets*.

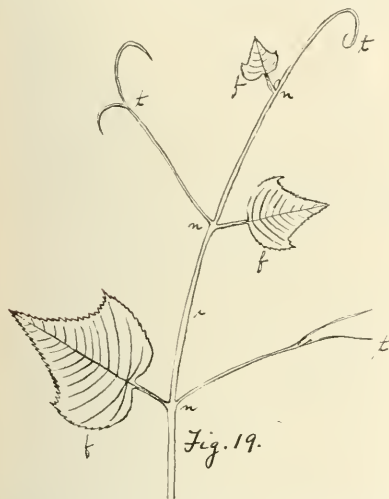
(5) *Corm*.—This is a product which is intermediate between a true tuber and a bulb. It is more in the nature of a thickened internode surrounded in some instances by some membranous scales, as in Crocus, Colchicum, etc. In some cases they do not possess these scales and are then spoken of as being "naked." In either case the product is known as a *Corm*.

(6) *Thorns*.—Stems are not infrequently modified to a hard-pointed and spiny element, as in the Japanese quince (*Cydonia Japonica* Pers.), when they are spoken of as *Thorns*. That a thorn is a modified branch is evidenced from the fact that foliage may arise upon it (Fig. 17), or even flowers may occur. Sometimes a branch thorn will occur upon a thorn (Fig. 17).

(7) *Twincers and Climbers*.

We have further to observe that there are plants which rise on other plants or supports, either by attaching themselves or by coiling around

them. They are distinguished as *Twiners* and *Climbers*. *Twiners* do not have any special development other than the stem for grasping supports, as in Morning Glory (Fig. 18). *Climbers*, however, rise by means of especial elements, which may be roots, as in the Ivy (*Hedera Helix* L.), and are therefore called *Root Climbers*. Leaves may be the means by which plants climb, as in



Portion of the stem of a grape-vine. (n) node; (i) internode; (l) foliage leaf; (t) tendril, being a modified branch. Clematis species, and these are called *Leaf Climbers*. Finally, some plants climb by means of tendrils, as the Grape Vine (Fig. 19), and hence are called *Tendril Climbers*. These tendrils are in some cases further provided with disc-like attachments for holding the plant to a fixed object, as in Virginia Creeper (*Ampelopsis quinquefolia* Mx.).

PRACTICAL STUDIES.

(1) Take some seeds of pea, bean, corn, mustard, and put them in separate dishes or plates and pour water over them. Allow them to remain in the water and swell for about 12 hours. Then place them in a number of boxes containing moistened sawdust, or shavings or excelsior and allow them to germinate and grow for a week or more.

(a) Lay one box flat. Incline another, at an angle of 45 degrees, and away from the light. Incline another at the same angle towards the light. Observe the following points (a) The direction that the root takes. (b) The direction that the stem with the leaves take. (c) Is the position the same in all the plants and in all the boxes?

(b) Carefully examine the plants growing in shavings or sawdust from day to day and see if any white hairs are to be seen. What is their position? Is it the same in all of these plants, or in all plants of the same kind? What are these hairs and their function?

(c) Take a plantlet of pea when the root is about one inch in length and divide the apex into 10 equal divisions by means of a fine pen and India ink. Take a pin and pierce it through one of the cotyledons and attach it to a cork so that it lies horizontally. Put the cork with the pea in a moist chamber which may be conveniently made by removing the bottom of a large ($\frac{1}{2}$ gallon size) white glass bottle. This may be done by tying a string saturated with turpentine around it near the bottom and heating it. The bottle cracks at the place of heating. Place a cork in the upper portion. The lower portion may be placed in a plate or dish containing water. Put

the cork with germinating peas on any convenient stand in the moist chamber and observe two things: (1) the direction of growth of the root and (2) the portion of the root when the growth in length takes place most visibly.

(d) Remove carefully a plantlet that has been grown in shavings or excelsior, and put the top portion on a glass slide and examine by either a strong hand magnifying glass or the low power of the microscope. Note how the tip portion of the root differs from the other portions of the plant.

(e) When 3 to 4 pairs of leaves have been developed in the bean, corn and mustard plants, compare them with each other as to height on the stem, form, size, etc. Compare with the leaves of the Indian corn. Note any and all differences between the development of these 4 plantlets.

(2) Compare a sweet potato with a white potato. Are there fibres produced upon both? Are there eyes produced on both?

Put both into a dark, damp closet for several months and note from time to time the difference in the two. What arises from the eyes on the white potato? Are there any similar developments on the sweet-potato? What are the structures developing from the eyes of the white potato? What is the difference between a white potato and a sweet potato.

(3) *White Potato*.—Examine a number of white potatoes and see if there is any remains of the stem by means of which it was attached to the parent plant. Examine the eyes and see if a scale may be seen on the lower side. What has arisen from the axil of the scale? Is there any definite arrangement of these eyes on the white potato? What is a white potato?

Cut it across and see if rings indicating a stem structure is apparent. Scrape the cut surface and place on a glass slide and examine by means of the compound microscope. The grains are starch and will be colored blue by iodine. Are any similar grains found in the sweet potato?

Take a white potato and peel it and then weigh it. Allow it to remain on an exposed surface in a room kept at the ordinary temperature for a few days and then weigh it again. Is there any difference in weight? Is it heavier or lighter? What is the difference due to? Compare the experiment with an unpeeled potato. Is there the same kind or amount of difference in the corresponding time? What causes the differences in the two?

(4) *Bulb of Onion*.—What is the shape of the bulb? What is the color? Is it smooth or rough? What is the shape of the base? What is upon the outside of the onion? Is it thick and homogeneous or scaly and papery? Cut two onions (1) transversely through the middle and the other (2) longitudinally. What is the difference between the inside and outside, in color and texture? What is the difference in odor. Why was the odor not so strong until the onion was cut? What is at the very center of the onion? What are the thickened layers upon the inside? Add a weak iodine solution to one of the fleshy scales and observe if it contains starch. What is the function of the scales upon the outside? How does an onion bulb differ from a garlic bulb?

(5) *Rhizome of Podophyllum*.—Take the commercial drug. See if on wall a terminal bud can be found. If so soak it in lukewarm water for several hours and dissect carefully and lay the elements side by side and compare. Examine the rhizome and observe a few large scars on one side and more numerous smaller scars on the other? How else do they differ and what are they the scars of? Are there any other scars? Take a section and add a weak iodine solution and see if it contains starch.

(6) *Stems*.—Gather a number of overground stems of plants, as rose, oak, hickory, elm, lilac, geranium, morning glory, hop, Virginia creeper, grape-vine, etc., and compare in every particular as to size, surface, color, disposition of nodes and internodes, manner of growth, etc. If any are climbing or twining in what manner do they move and by reason of what special adaptations? How do the rose and hop stems differ from the others?

PHARMACY.

UNGT. CHRYSAROBINI COMP. UNNA.—Chrysarobin (5 p.), ichthylol (5 p.), salicylic acid (2 p.), lanoline (30 p.), and vaseline (58 p.).

UNGUENTUM SALVO-PETROLIA.—An ointment, according to Dr. Anfrecht (Ph. Ztg.) consisting chiefly of yellow vaseline, with a small quantity of other fats.

SALICYLATED OINTMENT.—Salicylic acid, 10 Gm., dissolved in a small quantity of alcohol; benzoin, 2 Gm.; lanoline and olive oil, of each 30 Gm. The last two are melted together before mixing. (Ztsch. f. Ph.)

CASCARA SAGRADA PILLS.—Extract of cascara sagrada (2 Gm.), extract of frangula (1 Gm.), powdered aloes (4 Gm.), powdered gentian (4 Gm.), and powdered soap, q. s. To make 80 pills, 1 to 4 pills at bedtime. (Südd. Ap. Ztg.)

GELATIN AS HÆMOSTATIC.—Gelatin has been found an excellent hæmostatic for internal bleeding as well as for external injuries. It is employed in form of warm solutions (5 to 10 p. c.) or as a 0.7 per cent. sodium chloride solution. (Ztsch. f. Ph.)

FROHMANN'S SOLUTION. A local anæsthetic used in dental practice, has the following composition: Cocaine hydrochloride (0.20), morphine hydrochloride (0.25), sodium chloride, sterilized (0.20), antipyrine (1.0 to 2.0), guaiacol (2 drops), and distilled water (100.). (Südd. Ap. Ztg.)

CREALBIN is a new substance prepared by mixing a solution of albumin with creolin and precipitating the resulting compound with dilute hydrochloric acid. The precipitate is collected on a filter, washed and dried, then powdered and heated at 115° to 120° C. It contains about equal parts of albumin and creolin. (Ph. Weekh.)

HYDRARGYROL.—A new antiseptic, of the composition of paraphenyl-thionate of mercury. A number of advantages over most other mercurial antiseptics are claimed for it, viz., it is perfectly stable, very soluble in water, non-caustic, does not coagulate albumins, does not act on metals, and its toxicity is comparatively low. (L. Union Ph.)

INDELIBLE INK.—Dissolve soda (1.4 p.) and gum arabic (1.25 p.) in distilled water (5.3 p.). To the solution add silver nitrate (0.7 p.) and ammonia water (1.25 p.). The mixture is heated cautiously on a water bath, until it becomes nearly black and clear. The writing appears at first brown, but becomes black within an hour. (Ap. Ztg.)

A BERZELIUS MUSEUM is to be established by the Swedish Academy of Science, with funds provided by Prof. H. Sjörgen. It is to hold all the objects formerly contained in the laboratory of the great chemist—which are now scattered in various places. In connection with it a list of all the works and treatises of Berzelius is to be compiled. (Pop. Sci. Monthly.)

FERRIC SULPHATE AS DISINFECTANT.—E. Riecke has examined ferric sulphate (tersulphate of iron) for its disinfecting power and has found that it may be used to better advantage than free acids. A 0.25 per cent. solution arrests the development of typhus and cholera bacilli, and the germs of these micro-organisms are destroyed in faeces within one minute after applying this solution. (Ztsch. f. Ph.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.
Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Books' on the Manufacture of Tablet Triturates.

(F. J. F.) This journal has published a number of articles and formulas on the manufacture of tablets and tablet triturates which you can easily find by consulting the various indexes. Two valuable little books on the subject are "Tablets, Tablet Triturates, and Compressed Suppositories," by Prof. Virgil Coblenz, published by Whitall, Tatum & Co., of this city, and "How to Make Tablets," by Frank Edel, published by the Spatula Publishing Co., Boston.

Tr. Polygon. Hydropip.

(C. M. R.) submits the following prescription asking information regarding the identity of the third ingredient:

R Oil, rupe aa 5j
Oil, sabin aa 5j
Tr. polygon, hydropip. 5j
Oil, amyg. ex. 2 grains
Mucil. ac.
Aq. menth. pip. aa 5ij

M. Sig. 5j night and morning. The third ingredient is tincture of water pepper or smart weed (polygonum hydropiperoides). The prescription is intended as a diuretic emmenagogue, tincture of water pepper possessing to a certain extent stimulant and emmenagogue properties, but not to such a great degree as either of the first two ingredients. Unless the tincture be very weak in alcohol a satisfactory emulsion cannot be made with mucilage of acacia. Some other emulsifying agent not incompatible with alcohol should be used.

Calomel and Sodium Bicarbonate.

(C. M. R.) submits the following:

Sodium bicarbonate, ... 15 dram
Bismuth subcarbonate, of each 15 dram
Calomel 2 grains
Codain 2 grains
White sugar 1 dram

Mix and divide into sixteen equal parts. Dose, every four hours a powder. This prescription is probably written by a German physician and any one familiar with German chirography (which in this instance we cannot reproduce) would have no difficulty in reading it. As the combination is to be dispensed in powders it may be put up, though triturations of calomel with bicarbonate of sodium very slowly form corrosive sublimate, but the change does not occur within four to six weeks ordinarily (Scoville). The calomel should be very thoroughly triturated with the sugar before admixture with the other ingredients. Several reactions may occur upon contact of the powder with water.

Cigar Flavoring.

(G. B.) See this journal, Oct. 21, 1897, page 600. "Fillers" are sometimes flavored with a concentrated infusion made from the cuttings of Havana tobacco. This process may be called a natural flavoring. For artificially reaching the same end, the following have been recommended:

(1) Fluid extract valerian 1 ounce
Tincture tonka beans 8 ounces
Alcohol, enough to make 16 ounces
(2) Tincture valerian 4 drams
Butyric ether 4 drams
Tincture vanilla 2 drams
Spirit nitrous ether 1 dram
Alcohol 5 ounces
Water, enough to make 1 pint

(3) Valerianic acid	3 drams
Acetic ether	40 minims
Butyric ether	10 minims
Alcohol	4 pints

We have no formula at hand in which apple vinegar is employed.

Loeffler's Solution.

(G. R.) A number of formulas have been published under this title. Here are some of them:

(1) Menthol	10 grams
Toluol, q. s., to make	36 Cc.
Then add:	
Absolute alcohol	60 Cc.
Solution ferric chloride (4, P.)	4 Cc.
(2) Menthol	10 grams
Toluol, q. s., to make	36 Cc.
Then add:	
Cresolin	2 Cc.
Absolute alcohol	65 Cc.

(3) A staining agent sometimes used in the histological laboratory and known as "Loeffler's Alkaline Solution" is prepared by adding 30 Cc. of a concentrated alcoholic methylene blue solution to 100 Cc. of a solution of caustic potash (0.01:100). Filter before using.

Loeffler's Mordant Solutions.

(1) Ten Cc. of a 20 per cent. solution of tannin. 5 Cc. of a cold saturated solution of ferrous sulphate. 1 Cc. of an aqueous or alcoholic solution of fuchsin (or 1 Cc. of an alcoholic solution of methyl-violet). (2) One per cent. solution of caustic soda. (3) Sulphuric acid solution of such strength that 1 Cc. will be completely neutralized by 1 Cc. of 1 per cent. caustic soda solution.

Phosphatic Egg Emulsion.

Milton H. Hickox, Dallas, Tex., submits the following formula for a preparation sometimes dispensed as "egg emulsion":

Glyceolin	5 drams
Cod liver oil	4 ounces
Aromatic spirit of ammonia	1 dram
Sherry wine	2 ounces
Dilute phosphoric acid	3 drops
Oil bitter almonds	2 drams
Alcohol (to dissolve the almond oil)	2 drams

Directions: Glyceolin is made by beating together equal measures of yolk of egg and glycerin. Put the glyceolin in a mortar, add the cod liver oil slowly drop by drop, stirring briskly all the time, until the resulting mass has the consistency of soft butter; add the other ingredients slowly and in the order named, stirring constantly. Jamaica rum may be substituted for the sherry wine.

With the exception of aromatic spirit of ammonia this formula is very similar to that given by the National Formulary for "Emulsio Phosphatica." Many prescribers will doubtless object to the formula on this account as a reaction takes place between the alkali of the spirit and the fatty oil, forming a soap, and later with the phosphoric acid forming ammonium phosphate. We know of no better formula than the N. F. preparation which, for the sake of uniformity, is to be preferred.

Solution Calcium Bisulphite.

(F.) was asked to dispense this formula:

Solution calcium bisulphite,	
Tincture cudbear, q. s.	

Apply to meat.

He asks how to make a solution of this character. He visited a dozen drug stores in a large city and was unable to procure it.

According to Roscoe and Schorlemmer, a solution of calcium bisulphite in aqueous sulphurous acid is met with in commerce. It is obtained by passing sulphur dioxide into milk of lime, and is used by brewers to give beer stability. Here is a formula: Suspend 10 parts of chalk in 100 parts of water, and pass a current of sulphurous acid gas through the mixture until the solution is saturated. If you desire to make this solution on a

large scale, you will have to adopt a more economical method for making sulphurous acid than the one generally employed, viz., generating it in a flask or retort from charcoal and sulphur. You can probably secure this preparation from some dealer in brewers' supplies in your city. If not write to D. D. Williamson & Co., 14 Dey street, this city, who manufacture both bisulphite of lime and bisulphite of potassium. It is said that bisulphite of lime applied to meat keeps it well and that there is no danger attending the use of it, since a portion of the sulphurous acid volatilizes and the remainder with the sulphite is changed into sulphate of lime, which is innocuous. A simple washing suffices to remove the preparation at the time of preparing the meat.

Coloring For Colognes and Toilet Waters.

(C. F. B.) Chlorophyll may be employed for coloring alcoholic solutions of a green tint. This substance may be purchased or it may be prepared as follows: Digest leaves of grass, nettles, spinach or other green herb, in warm water, until soft; pour off the water, and crush the herb to a pulp. Boil the pulp for a short time with a 12 per cent. solution of caustic soda, and afterward precipitate the chlorophyll by means of dilute hydrochloric acid; wash the precipitate thoroughly with water, press and dry it, and use as much for the solution as may be necessary. Or a tincture made from grass as follows may be employed:

Lawn grass, cut fine	2 ounces
Alcohol	16 ounces

Put the grass in a wide-mouth bottle, and pour the alcohol upon it. After standing a few days, agitating occasionally, pour off the liquid. The tincture can be used with both alcoholic and aqueous preparations.

Among the anilines spirit-soluble malachite green has been recommended.

A purple or violet tint may be produced by using tincture of litmus or ammoniated cochineal coloring. The former is made as follows:

Litmus	2½ ounces
Boiling water	16 ounces
Alcohol	3 ounces

Pour the water upon the litmus, stir well, allow to stand for about an hour, stirring occasionally, filter, and to the filtrate add the alcohol.

The aniline colors "Paris violet" or methyl violet B, may be similarly employed. The amount necessary to produce a desired tint must be worked out by experiment. Yellow tints may be best imparted by the use of tincture of turmeric or saffron, fustic, quercitrin, etc.

Dry Smelling Salts.

(N. R. B.) The so-called "dry smelling salts" are generally prepared by intimately rubbing together in a porcelain mortar equal parts of sal ammoniac or ammonium carbonate and lime freshly slaked to a powder, and perfuming the mixture, according to the quality of volatile salts desired, with a finer or inferior perfume. Deite gives the following under the title:

White Smelling Salt.

Mix in a capacious porcelain mortar 2.2 pounds of ammonium carbonate with 1.1 pound of ammonia, cover the mortar and let it stand quietly. In the course of a few days the contents have been converted into normal carbonate of ammonium. The latter is reduced to a coarse powder and perfumed with bergamot oil 0.56 dram, lavender oil 0.9 dram, nutmeg oil, clove oil and rose oil, of each 0.28 dram, and cinnamon oil 2.82 drams. The incorporation of the volatile oils is effected by first triturating about 1-10th of the salt with the oils and then gradually incorporating with this perfumed mass the rest of the salt. In this manner a uniform distribution of the odor is effected:

- (2) Powdered chloride of ammonium $1\frac{1}{2}$ ounces
 Powdered carbonate of potassium $1\frac{3}{4}$ ounces
 Coarsely powdered carbonate of ammonium 3 drams
 Oil of cloves, ...
 Oil of bergamot, of each 10 drops
 Potassium carbonate, granulated 2 drams
 Ammonium muriate 2 drams
 Camphor, powdered 20 grains
 Cubeb, powdered 20 grains
 Coriander seed, powdered 5 grains
 Oil sassafras 1 drop
 Oil cloves 2 drops
 Oil peppermint 2 drops
 Oil bergamot 2 drops
 (4) Here is a formula for "pungent smelling salts" which is said to produce a very fine article:
 Ammonium carbonate crushed into a coarse powder 6 ounces
 Sal ammoniac, granulated 1 ounce
 Caustic potash, crushed fine 2 ounces
 Orris root, in coarse powder 4 ounces
 Lemon peel, in coarse powder,
 Rosemary leaves,
 Lavender flowers, coarse powder,
 Cloves, of each 1 ounce
 Cinnamon, ...
 Calamus, each in powder $\frac{1}{2}$ ounce
 Oil bergamot $\frac{1}{2}$ ounce
 Oil lemon 2 drams
 Extract musk or civet $\frac{1}{2}$ ounce
 Stronger water of ammonia $\frac{1}{2}$ ounce

Pickle to Give Meat a Red Color.

(II. H.) There are many formulas and processes for curing meats but we are informed by those in a position to know that success depends quite as much upon other considerations, experience in packing, storing, etc., as it does upon the particular formula employed. As a general rule saltpeter is employed in the manufacture of the "pickle," as it is a preservative and tends to heighten the color of the meat. Coloring substances may also be used for imparting the "red" shade so much desired by packers, but the particular substance employed probably varies with the individual packer who considers this part of his business his trade secret. For coloring sausages a non-poisonous fat-soluble, aniline is sometimes employed. We are told that if meat is properly dressed, packed and cured it needs no additional coloring beyond that given to it by a pickle containing the proper amount of saltpeter. Here are some formulas:

- (1) Salt 18 pounds
 Sugar $4\frac{1}{2}$ pounds
 Saltpeter 1 pound
 Saturated solution of boric acid 5 gallons
 (2) Sugar 2 pounds
 Fine salt 4 pounds
 Saltpeter $\frac{1}{2}$ pound
 Water 2 gallons

This pickle is said to give meat a fine red color, while the sugar renders it mild and of excellent flavor.

- (3) Fine salt 20 pounds
 Sugar 6 pounds
 Saltpeter $\frac{3}{4}$ pound
 Boric acid $1\frac{1}{4}$ pounds
 Water 4 gallons

(4) According to the Techno-Chemical Receipt Book meat and other organic substances can be preserved by adding to them a minute quantity of fuchsine. Pieces of beef enveloped in blotting paper soaked with gelatine and fuchsine were found to keep unaltered. By being soaked in water for 24 hours the beef became perfectly fresh, and furnished a soup in which no disagreeable flavor could be detected.

The sulphites have also been recommended for the preservation of meat, a French publication giving this formula:

- Ammonium sulphite 38 parts
 Sulphurous acid 39 parts
 Soda 21 parts
 Water 2 parts

Just how the preparation is to be used is not stated. See also remarks to query "solution calcium bisulphite" elsewhere in this department.

Giving Copies of Prescriptions.

(S. C. W. We do not think any druggist, unless forbidden to do so by the prescriber, would refuse to give a customer a copy of a prescription. We cannot tell whether the courts if appealed to would uphold the druggist in refusing to give a copy or compel him to do so. Were some one able to tell us to whom the original prescription belonged, for physician, pharmacist and patient have each claimed it, we might answer your question. Decisions have been rendered in favor of each of these individuals. If it belong to the druggist, then that individual can use his pleasure about giving a copy (unless the law prohibits or the physician objects). If the prescription belong to the patient and the druggist retain it, he simply does so through the courtesy of the patient and the druggist would certainly feel under obligation to give a copy when asked to do so. The copy of a prescription, contract or other instrument, does not, in the majority of cases, carry very much weight in a court of law. Whatever force or legal standing it gets is conferred upon it by the original. Therefore the ownership of the prescription would have to be determined in the solution of the question. We have always naturally believed that the druggist should retain the prescription, for it is a written order for him to supply certain drugs, and if he allows it to go out of his hands he has nothing to show that he was directed to supply certain drugs of a certain specified quality. In support of this belief a few of the States have laws directing the druggist to keep on file for a specified time all prescriptions filled by him. Where the law does not allow the druggist to retain the original prescription, to give or not to give a copy cuts but little figure. If the patient wants the prescription he can have the original. At all events, the average druggist, unless forbidden by the prescriber, will gladly give a copy of any prescription if he can only get the chance to dispense it. It is business policy for him to do so. He cannot afford to run the risk of losing one customer of any kind of importance, especially when the favor requested is so modest and unimportant. Regarding the statutory laws in some of the States requiring the druggist to keep on file for a specified number of years the prescriptions he dispenses, we append the following abstracts:

California Pharmacy Act, Chap. 85, sec. 9 (1891)—"Every registered pharmacist shall file or caused to be filed all physicians' prescriptions compounded or dispensed in his store; they shall be preserved for two years, and he shall furnish a correct copy of any prescription upon the order or request of the attending physician." Violation of this section is made a misdemeanor, etc.

Kansas, Chap. 174, sec. 4, schedule C, etc.—"All prescriptions of practicing physicians shall be retained by the dispenser."

Missouri, Revised Statutes, 1880, sec. 4622—"Every druggist, proprietor of drug store, or pharmacist shall carefully preserve all prescriptions compounded by himself or those in his employ, numbering, dating and filing them in the order in which they are compounded, and shall produce the same in court or before any grand jury whenever thereto lawfully required, and on failing, neglecting, or refusing so to do, shall be deemed guilty of a misdemeanor." etc.

Rhode Island, Chap. 131, "On Medicines and Poisons," sec. 9—"All prescriptions . . . shall be carefully kept by the pharmacist on a file or in a book used for that purpose only, and numbered in the order in which they are received or dispensed, and every box, bottle, vial, vessel, or packet containing medicines so dispensed shall be labeled with the name and place of business of the registered pharmacist so dispensing said medicine, and be numbered with a number corresponding with that on the original prescription retained by said pharmacist on such book or file. Such prescriptions shall be preserved at least 5 years, and shall be open to the inspection of the writer thereof, and a copy shall be furnished free of expense whatever, when demanded by either the writer or purchaser thereof."

A number of other States which enact similar laws are in force require the druggist to keep on file prescriptions for liquors, while still other States require prescriptions containing certain named poisonous drugs to be kept on file.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, JANUARY 27, 1898.

No. 4.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York.
By D. O. HAYNES & Co.

Subscription Rates:
U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,
Telephone: 5315 Cortlandt. P. O. BOX 1483, NEW YORK.
Cable Address: "ERA"—New York.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL..... 119	Pharmacists' Cigar Com- pany..... 139
CORRESPONDENCE..... 120	News Letters..... 139
ERA COURSE IN PHARMACY. 121	BUSINESS RECORD..... 145
Inorganic Chemistry..... 124	Ohio State Pharmaceutical Association..... 146
Botany..... 124	Association, Board and Col- lege News..... 149
New Method of Examining Pepsin..... 129	Takamine Before Chemical Industry Society..... 150
PHARMACY..... 131	New York College Considers Vanilla..... 150
QUESTION BOX..... 132	OBITUARY..... 153
NEWS DEPARTMENT..... 135	PATENTS, TRADEMARKS, ETC..... 154
Drug Trade Section, New York Board of Trade..... 135	TRADE DEPARTMENT..... 154
Dr. Simmons Attempts Murder..... 136	State of Trade..... 155
Fight for Shorter Hours Law..... 137	New York Market..... 156
M. W. Alexander Falls..... 138	PRICES CURRENT..... 157
Castoria Not a Trademark..... 138	TRADE NOTES..... 160
Crude Drugs Before Ap- praisers..... 138	
To Lock Up Drunkards and Opium Fiends..... 139	

"The British and Colonial Druggist," London.

Subscriptions and advertisements for this weekly drug journal will be received and forwarded through this office. Specimen copies and schedule of rates will be furnished upon application.

THE ERA FORMULARY.

The season for cough and cold remedies is now at its liveliest period and later on there will be the customary demand for spring medicines and blood purifiers. A good collection of formulas for making preparations of this sort is a most important foundation for a good trade in such medicines. The choice of a good formula is often the factor which develops a small business into a large one. The Era Formulary with its 5,000 formulas furnishes a most varied list to choose from. Its department devoted to Family Medicines contains 772 formulas, among which are 95 for remedies for coughs and diseases of the air passages, and in the spring medicine line there are 20 formulas for blood purifiers, 42 for biters, tonics, etc., 26 for remedies for rheumatism, 12 for kidney and liver preparations, 24 for laxatives, etc. With this collection to draw from the druggist is certainly in a good position to meet the demands of his customers, and the investment of \$5 for the book gives him in addition over 4,000 other formulas which guide in the manufacture of about all the medicinal, toilet and technical articles which people expect to find in a drug store.

A Poison Defined.

Section X. The term poison used in Section Y. shall be construed to mean any substance, which, when administered or taken internally by an average full-grown person in quantities of one drachm (4 c.c.), if liquid, or of four grams if solid, or less, produces such effects upon the human system as to endanger life.

The above quoted definition the Academy of Pharmacy, of Cincinnati, is reported to desire to have inserted in the pharmacy law of Ohio, or, rather, it is proposed as an amendment to that law.

We have seen may definitions of the word "poison," but this is the most singularly unique one which has ever come to our notice. There are very many drugs which will cause deleterious, even dangerous, effects in quantities considerably less than 4 grams (61 + grains), but which cannot logically be considered poisons, and are not so considered by any law or custom. A 60 grain dose of quinine would not be contemplated with equanimity, yet who would term quinine a poison.

As a matter of fact, a hard and fast definition remains to be formulated; there is no thoroughly satisfactory one yet. All that can be done by the law is to specifically name those articles which are to be treated as poisons. To adopt a general definition and leave its application to the individual judgment of the seller affords a vast opportunity for variance and danger to all concerned. Prepare a definite list; all within that list poisons, those outside it not poisons. A possible lot of litigation and legal wrangling would be saved by such course. But, for goodness' sake, don't attempt to modify a bad law by making it worse. The Cincinnati proposition is absurd on the face of it, and we hope the Academy of Pharmacy has been incorrectly advertised as its sponsor.

Liquor Sales By Ohio Druggists.

The Dow tax for selling liquor in Ohio is a rather heavy one, and there is a class of druggists who object to it. It would seem that the law is broad enough, as it gives druggists all that legitimately and properly belongs to them. It allows them to sell liquor on prescription, not to be drunk on the premises, but it very properly says they shall not sell it as a beverage. A couple of druggists of a small town in that State have gotten into trouble with the Dow law. They have been convicted of violating its provisions, and the county auditor and treasurer have seized their stocks of goods and propose to sell them to meet the tax. The druggists in turn propose to test the constitutionality of the Dow law. They deny evil doing, and state that the information on which they were convicted was false. Each druggist (plaintiffs in suits just brought) claims that "the said county auditor wrongfully and unlawfully assuming and presuming that the plaintiff is engaged in the business of trafficking in intoxicating liquors," has entered upon the duplicate in his office, such as is authorized by law, an assessment against him of the sum of \$350, being the amount of the yearly assessment under the Dow law. It is said that the treasurer has been furnished with a copy of the record by the auditor together with a penalty of 20 per cent. on the taxes and the cost of collecting the same, or four per cent. additional. The whole business

amounts to \$70 for the penalty and \$14 for the collection and with the \$350 tax makes \$434. This tax plaintiff states is a lien upon his chattel and real property, and especially upon the goods, chattels and merchandise in the drug store and encumbers and casts a cloud upon the title. If the treasurer is permitted to proceed with his sale of the property the plaintiff says that he will be injured greatly and will have no adequate remedy at law.

We know nothing more of these cases. If the druggists have been honest and have not violated the law, we are sorry for them, and wish them success in their fight. But if they have knowingly and wilfully broken it, they deserve no pity, and should have the full penalty meted out to them. That's the position we hold. Observe the laws; if you take the chances don't squeal if you get caught.

The Board's Mistake.

There is a good deal of caustic criticism being uttered by the druggists of this city anent the action of the newly-created New York City Board of Pharmacy in selecting the New York College of Pharmacy for its secretary's office. This criticism would seem to be well justified; the board certainly has made a grave mistake at the very outset of its career. The board is a part of the machinery of the city, not of the college or any other private institution: it is to represent the druggists; to house it under the college roof is to lay it open to misconstruction of motives all the more natural because two-fifths of its membership has been drawn from the official and faculty list of the college.

We would not say, nor do we believe, that any ulterior motive dictated the selection of the college as headquarters, but it was a mistake which cannot be too quickly remedied. Beside the matter of principle involved, it was a mistake on the score of convenience. The secretary's office should be where it can be reached with the least trouble by the greatest number. Such a place is not way up on the west side, to journey whither Brooklynites and other Long Islanders and Staten Islanders must pay extra fare. Get it down near the City Hall and give all a fair show.

A Lesson For Department Stores and Others.

The department stores of Denver, Col., bit off a little more than they could chew, and the whole country is laughing at their discomfiture. Some three weeks ago these stores, fourteen of them, demanded of the daily newspapers of that city a reduction of from twenty to thirty per cent. in advertising rates, under penalty of withdrawal of patronage and a boycott of the papers. But the papers said no, and stuck to it, and, better than all, they instantly received the commendation and support of all that class of merchants and the public which sees no good in department store principles and methods. The fight stirred up the community greatly, the result being that the stores were almost forsaken by purchasers. Labor unions held meeting after meeting to contrive plans to spread the agitation and keep the people away from the department stores. During the agitation the papers printed a great amount of information concerning the quality of the goods, especially drugs and foods, usually handled by the stores, and there is reason to believe that the citizens of Denver will hereafter be much more discriminating buyers of such lines. The papers won the fight, and at a late hour one recent night the newspaper offices were visited by a representative from each store in the combination, who acknowledged that they were beaten and would resume their advertising contracts as soon as arrangements could be made.

A little discipline of this sort energetically rubbed in would be a good remedy to try in other cities. We believe newspapers would get more advertising patronage if they would refuse altogether the patronage of department stores. The little fellows and the great rank and

file of merchants who do business on legitimate principles would then come in. They stay out now, for they cannot match the delusive bargains, and their small ads are not imposing beside the page and two page displays of the "stores."

The Denver experience has demonstrated that department stores live by advertising, and, too, that they do not own the whole earth with a few other planets thrown in for bargain measure. The newspapers of that city are to be commended for their courageous stand and congratulated upon their victory.

The Virginia Senate is exercising its powers of logic and rhetoric over a bill granting a certain doctor in that State the privilege of compounding prescriptions without being examined by the board of pharmacy. His argument is that if he is able to do the pharmaceutical trick for his own patients, he is equally competent to do it for any other doctor's patients. If he is as competent as all this, he ought to be willing and able to demonstrate his competence to the board of pharmacy, instead of trying to sneak in the back way.

In the January 6 Era was published a letter from the A. P. Sawyer Medicine Co., of Chicago, in which it was intimated that the Western Druggist was prepared and intended to show up the error of the Era's ways in the matter of our published description of the peculiar and not altogether satisfactory business methods of the medicine company. We wonder how Sawyer likes the "editorial" giving the entire facts in the matter" which appeared last week in the Western drug paper referred to.

There is a little excitement in drug circles of Charleston, Ia. The Christian Citizenship League was defeated in an attempt to assess the \$600 mulct tax against drug stores, but continues the fight by placing in the hands of the judge papers praying him to revoke the pharmacy permits of the drug stores. And the end is not yet.

Bay City, Mich., is rejoicing over the prospect that it will in all probability be selected by the United Alkali Co., Limited, of Liverpool, England, as the site for the establishment by this concern of a mammoth American plant. The industry is a great and important one, and Bay City is to be congratulated if it gets it.

Mr. Barkman Will Continue to Cul.

Binghamton, N. Y., Jan. 18.

To the Editor.

Gentlemen:—I saw an article in the Era of last week, stating that I had been restrained from selling the Pheno-Caffine pills at a cut price. Now, there is not a word of truth in it. I have sold the Pheno-Caffine pills for a number of years for fifteen cents a box, and shall continue to do so, and do not think any court of justice will restrain me or any one else from selling what I or they pay for, at any price they may see fit. I bought a few pills of one of their traveling men (and, by the way, I paid for them, too), and the court restrained me from selling what I had left of said purchase, because I did not oppose their doing so, for reasons that I will make known later.

I did not care about the pills that I had left from the lot I bought from their agent, as I can get all the Pheno-Caffine pills I want and for the same price I bought them from their agent at first. Now, I understand all there is of the Pheno-Caffine Pill Company is a man by the name of John Garst, who thinks he can get a little free advertising out of it by sending out his circular letter to the retail druggists.

If nothing happens more than I know of now, I shall continue to sell Pheno-Caffine pills at the cut price of 15c. a box as usual. So you can see all there is of his injunction.

I wish you would kindly correct the statement made in the last week's Era in regard to this matter. Yours,
DR. M. BARKMAN.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblentz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Albert E. Ebert, Ph.M., Ph.D.	Charles W. Parsons, Ph.C.
James M. Good, Ph.G., M.D.	Edgar L. Pritch, Ph.G.
Arthur L. Green, M.D., Ph.D., Ph.C.	George F. Payne, Ph.G., M.D.
Charles F. Heebner, Ph.M.B., Ph.G.	T. D. Reed, M.D., C.M.
George B. Kauffman, B.Sc., Phar.D.	Edsel A. Ruddiman, Ph.M., M.D.
E. J. Kennedy, Ph. C.	Henry H. Rusby, M. D.
Henry Kraemer, Ph.G., Ph.D.	Otto Sahli, A.M.
Edward Kremers, Ph.G., Ph.D.	L. E. Sayre, B.S., Ph.M.
	Wilbur L. Scoville, Ph.G.
	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Otto A. Wall, Ph.G., M.D.
	Frederick J. Wulling, Ph.G.,

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as an auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in **THE PHARMACEUTICAL ERA**, and the **QUIZZES and EXAMINATIONS** are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and **DIPLOMAS** are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the **ERA**, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 39.

Inorganic Chemistry.

Combustion.

PROF. WM. SIMON, PH. D., M. D.

Historical.—While combustion, according to our modern views, embraces a great variety of phenomena, to the ancients combustion was, and to uncivilized people it yet is, identical with fire.

At what time fire was first used and controlled by man we know not. Indeed we are justified in believing that there has not been within historic time any race of men ignorant of fire. The use of it is the great practical distinction between man and the brutes, and without fire mankind could not possibly have become what it is.

Fire was, and with certain tribes is to-day, closely associated with religious customs and beliefs. According to a Greek myth it was Prometheus who bestowed on man the gift of fire which, concealed in a hollow fennel stalk, he stole from the gods; according to another legend, he procured it by holding a rod close to the sun.

The methods used in olden time for procuring fire were the same which are yet used by uncivilized people, and chiefly are various applications of concussion or friction. But the difficulty of procuring fire by these methods was so great that often fires were kept burning constantly, generally in temples or other places of worship. The "eternal lamps," burning yet in the synagogues and in many Byzantine and Roman Catholic churches, may be a survival of these fires, which were used by the Egyptians, the Mexicans and other nations thousands of years ago.

While man has employed combustion for thousands of years, and while the philosophers of olden times have indulged in speculations regarding the nature of fire, no explanation of the process of combustion was forthcoming until the latter part of the seventeenth century, when German alchemists promulgated the "phlogistic theory." According to this theory every combustible body is made up of two substances, one being of an earthy nature and remaining behind as ashes during combustion, the other one being a peculiar substance, termed phlogiston, which escapes as flame into the air. This theory, ridiculous as it may appear to us to-day, was upheld for over a hundred years, and it was not until oxygen had been discovered,

that a correct explanation of the process of combustion was given.

Nature of Combustion.—According to our modern views the term combustion, in its broadest sense, is applied to any act of chemical combination between two substances tak-

ing place with evolution of heat and light. In all ordinary combustions in atmospheric air, one of the two acting substances is oxygen, which is generally spoken of as a supporter of combustion; while the second substance, such as wood, oil, sulfur, etc., is termed combustible matter.

There are, however, many substances, other than oxygen, which support combustion; as, for instance, nitrogen monoxid, chlorine, fluorine, the vapors of sulfur, etc., all of which support the combustion of many substances, i. e., combine with them

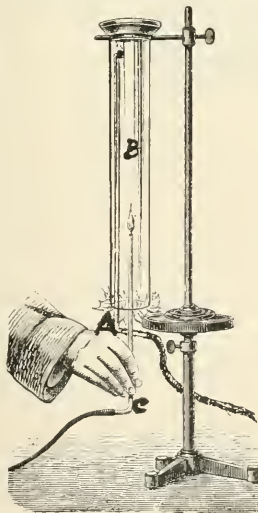


Fig. 43.

with evolution of heat and light.

The terms combustible matter and supporter of combustion are only relatively correct, since oxygen may be made to burn in illuminating gas, whereby it is made to assume the position of a combustible substance, whilst

illuminating gas is the supporter of combustion. Similarly, we may have a flame of hydrogen burning in a mass of chlorine, or a flame of chlorine burning in a mass of hydrogen.

An easily performed experiment showing the possibility of reversing the nature of combustible substance and supporter of combustion, is this. Illuminating gas is passed through the glass tube A (Fig. 43) into the inverted and suspended glass cylinder B. When the gas escapes from the cylinder it is ignited, while a slow current of the gas is continued into the cylinder. If now, the glass tube C, which is connected with a receiver of oxygen, be introduced into the cylinder, the escaping oxygen ignites when passing through the burning illuminating gas and continues to burn in the atmosphere of this gas above. (N. B.—It should not be forgotten to open the stopcock of the oxygen supply before introducing the tube, as otherwise an explosive gas mixture would be formed.)

An experiment showing the combustion of atmospheric oxygen in illuminating gas may be performed in this manner:

An ordinary glass chimney A (Fig. 44), held in position

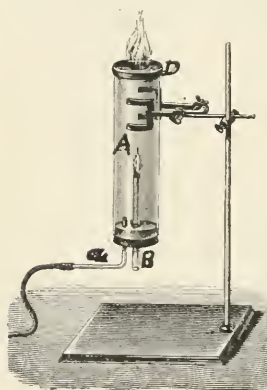


Fig. 44.

by a suitable stand, is provided at the lower end with a perforated cork through which passes a straight metallic tube B, of about one centimeter diameter and of ten centimeters in length, (a cork-borer answers well for the purpose), also a bent glass, tube C, which is connected by rubber tubing with the gas supply. The upper end of the chimney is closed with a piece of asbestos board D, in the center of which is an opening of one centimeter diameter. The experiment is performed by closing the hole in D with a stopper, or by placing a small porcelain evaporating dish over it, turning on the illuminating gas until the chimney is filled and igniting the escaping gas at the lower end of B, regulating the supply so that only a small flame appears. Upon now removing the small dish and quickly igniting the gas at the opening in the asbestos board, the flame at the lower end of B disappears, while a flame of burning atmospheric oxygen appears at the upper end of the tube and inside of the chimney. In other words, we have in the chimney an atmosphere of illuminating gas in which burns the air, drawn into the chimney by the draft generated by the burning flame above.

Slow Combustion.—This term is used to designate processes of oxidation taking place so slowly that the heat generated is not sufficient to produce the sensation of light. For instance, a piece of iron, after having been heated to a red heat, will burn energetically in oxygen gas. Also a piece of iron left exposed to the air will, in the course of time, combine with oxygen, forming the well-known iron rust, which is an oxid of iron. In both cases the iron is oxidized, and in both cases the same total quantity of heat is generated during oxidation of equal weights of iron. Yet, while in the first case this heat causes the iron to become intensely luminous, in the second case it is generated so slowly that it becomes practically unnoticeable, and no light is emitted.

We have similar instances in the burning of organic

matters. A piece of wood may be burned in a few minutes, evolving much heat and light during the process; the same piece of wood might be left exposed to the air and in the course of months or years it would disappear, in consequence of a slow oxidation or slow combustion taking place. The elements forming woody fiber, which is the principal constituent of wood, are carbon, hydrogen and oxygen. The final products formed either by ordinary or by slow combustion are identical, viz., carbon dioxide and water.

Another process of slow combustion is the one taking place in the animal system, where the food, after having undergone various other changes, is gradually burned up. The carbon and hydrogen contained in the food are converted into carbon dioxide, and water, the same products which would be formed if we were to burn the food directly in atmospheric air. The heat of the animal body is due to this slow combustion.

Oxidizing Agents.—In many cases, combustion may take place by means of oxygen held in combination. Substances which part readily with their oxygen when brought in contact with matters eager to combine with it, are called oxidizing agents. Thus, nitric acid is a powerful oxidizing agent, as can be shown by the following experiment:

Fill a wide test-tube to about one-fourth of its height with concentrated nitric acid and set it in a beaker filled with warm water. Cut a piece of charcoal to the size of a short lead pencil, ignite it at one end, and, by holding the other end with a forceps, suspend it in the nitric acid, taking care not to touch the test-tube which might break. The charcoal will continue to burn even though it is placed below the surface of the liquid acid, which of course furnishes the oxygen necessary for the combustion of the coal.

The oxidizing action of nitrates or chlorates readily can be shown by mixing a little powdered potassium chlorate (or nitrate) with about half its weight of sulfur. Upon igniting the mixture, rapid combustion takes place, the sulfur in this case taking its oxygen from the chlorate or nitrate.

Another experiment illustrating the same principle is this: Fill a glass cylinder with water, drop on the bottom a few crystals of potassium chlorate and a small piece of phosphorus; then pour through a funnel-tube, reaching to the bottom of the cylinder, concentrated sulfuric acid. The first action of the acid on potassium chlorate is the liberation of chloric acid, which is readily attacked by the phosphorus, which is thus made to burn quite luminously under the water.

Kindling Temperature.—Though there are masses of combustible matter continually in contact with atmospheric oxygen, and while many of them undergo slow combustion, yet they do not burn. The reason is that substances have to be raised to a definite temperature before active combustion takes place. The temperature at which this occurs is a certain fixed degree for each individual substance, which is called its kindling temperature.

Wide differences exist between the kindling temperatures of different substances. In some cases this temperature is below the ordinary temperature of the air, say below 20° C. (68° F.). Such bodies cannot exist in nature, because they would burn as quickly as generated, but they may be prepared artificially and have then to be kept in vessels from which oxygen is excluded.

Such a substance is, for instance, zinc-ethyl, a colorless liquid containing the elements, zinc, carbon and hydrogen. When this liquid is poured from the vessel in which it is contained, it ignites at once while passing through the air, even if this should be at the freezing point, showing that the kindling temperature of zinc-ethyl is below 32° F.

Phosphorus ignites at 50° C. (122° F.). The vapors of carbon disulphid have so low a kindling temperature

that they may be ignited by passing into them a heated glass rod. Other substances require a red heat and yet others, such as graphite, an intense white heat before they will burn.

After ignition has once begun, combustion in most cases continues, because the heat generated by it is sufficient to heat other particles of the burning substance to the kindling temperature. Combustion will continue so long as there is combustible material and a sufficient supply of oxygen, unless the temperature by some cause be lowered below the kindling point.

In some cases, as, for instance, ammonia gas or the diamond, the temperature produced by combustion in atmospheric air is not sufficient to maintain the kindling temperature; while this is done when air is replaced by pure oxygen.

Means for Ignition.—The methods first used for producing combustion were based on concussion or friction, and these are yet used by uncivilized people, or in exceptional cases by others, as, for instance, by hunters, explorers, etc.

The methods of concussion were based on producing a spark by striking together two pieces of flint, or a piece of flint and a piece of iron pyrites. The friction method, yet practiced by many tribes, consists in the generation of heat, necessary for ignition, by violently rubbing together pieces of dry wood. This is done by either quickly rotating a stick of wood in a round hole made in a stationary piece of wood, or by running back and forth a blunt pointed stick along a groove made in another piece of wood lying on the ground, or held between the knees.

Of other means of ignition may be mentioned the compression tube, which at one time was used, though never extensively. This instrument consisted of a metallic tube about twenty centimeters long and one centimeter wide, closed at one end. In this tube fitted an airtight piston provided with a handle. On forcing the piston very quickly into the tube, enough heat was set free to raise to its kindling temperature a piece of highly combustible tinder fastened to the piston. On quickly removing the piston from the tube the tinder continued to burn. As in the case of friction, this mode of obtaining fire requires considerable skill to obtain the desired result.

Another apparatus, much used in Central Europe some fifty years ago, for "obtaining a light" is Doebereiner's hydrogen lamp, which can yet be bought from dealers in chemical apparatus. This lamp (Fig. 45) is so arranged that hydrogen (generated by the action of dilute sulphuric acid on zinc) is made to pass, on opening of a stop-cock, upon platinum sponge on which it ignites in consequence of the strong absorbing power of the spongy platinum for hydrogen, and the heat generated thereby.

The principle used in the construction of Doebereiner's lamp may be shown by the following experiment: Hold a piece of clean platinum foil by means of a forceps in a Bunsen flame until it is red hot. Remove it quickly and hold it, while yet warm, against a current of illuminating gas issuing from a glass tube drawn out to a fine point. It will be seen that the platinum foil is kept red hot where the gas strikes

it, and the heat may become so intense that the gas is ignited. Substituting platinum sponge, i. e., very finely divided platinum, for platinum foil, the effect is yet more striking.

The modern methods of starting combustion are based on the low kindling temperature of phosphorus. This substance was at first used for this purpose in the following manner: A very small tube of lead, closed with a lead stopper, was filled with phosphorus. Thin wooden sticks, provided at one end with a little sulfur, were sold, together with the lead tube. By dipping a stick in the tube, a little of the phosphorus would adhere and on exposure to the air, or after rubbing, would ignite. The burning phosphorus would then ignite the sulfur, and this in turn would cause the ignition of the wood.

In our modern lucifer matches we have particles of finely divided phosphorus together with particles of oxidizing agents, such as nitrates, chlorates, manganese dioxide, etc., imbedded in a mass of glue, holding them together and to the wooden stick. By the friction of the match against a rough surface particles of phosphorus are heated to the kindling temperature and ignition is thus brought about.

In the so-called "safety matches" a mixture is used of potassium chlorate, potassium dichromate, red lead, and antimony trisulfide, held together by some glue. This mixture will not ignite by simple friction, but will do so when drawn across a plate covered with a mixture of red phosphorus and antimony pentasulfide.

Spontaneous Combustion.—This term is used to designate a kind of combustion which takes place in consequence of the heating of combustible matters to the kindling temperature by other than artificial means. The cause as a general rule is slow combustion. Thus, if we leave a piece of dry phosphorus exposed to air, it will undergo slow combustion, but enough heat may, and generally is, generated to cause the phosphorus to burst into flame.

A simple experiment may show this to better advantage. Dissolve a small granule of phosphorus in about five times its volume of carbon disulfide and pour this solution on a piece of filter paper, holding the latter by a forceps. The highly volatile carbon disulfide will evaporate rapidly, leaving the phosphorus in a very finely divided state on the paper. The rapid oxidation of the phosphorus will speedily cause its ignition.

Almost every one is familiar with the increase of temperature generated in masses of straw or leaves when mixed with manure, as also in piles of hay packed before being quite dry. The heat here generated also is due to chemical action and may become sufficiently high to cause spontaneous combustion. Many a hay stack has thus been ignited.

Most dangerous, however, are certain easily oxidized oils, belonging either to the class of fat oils, such as linseed oil, or to the volatile oils, such as oil of turpentine. These oils undergo a constant oxidation, when exposed to the air. When kept in vessels, even if they be open, there is no danger of ignition, because the oxygen acts on the exposed surface only. But if a cloth be moistened with one of these oils, each fiber is coated with a thin film of the oil, and the surface presented becomes so very much larger that the oxidation taking place soon causes a perceptible rise in temperature, often leading to spontaneous combustion. It is most important to bear this fact in mind, since hundreds of conflagrations have been caused by the careless manner in which a rag was thrown aside, one that had been used for cleaning oil machinery, for oiling a floor, or for some similar purpose.



Fig. 45.

CHAMPAGNE-MILK.—A new beverage bearing this name has recently been put on the market by a Frenchman. It is stated to be prepared in the following manner: Cream is sweetened with syrup, placed in a closed vessel, in which it is sterilized by passing a current of oxygen through it, and then charged with carbonic acid. —(Ztsch. f. Ph.)

POISONING WITH INSECT POWDER has been observed in the case of a child 11 months old. The powder had been administered by mistake and the result was coma, laborious breathing, weak pulse and nausea. After giving an emetic the poison was ejected and the patient recovered. (Ph. Post.)

LECTURE NO. 40.

Botany.

BY HENRY KRAEMER, PH. G., PH. D.

REPRODUCTIVE ELEMENTS (Continued).

We have thus far considered the following elements of the flower:

Essential Elements.	(1) Gynæcium consisting of pistils.
	(2) Androecium consisting of stamens.
	(3) Corolla consisting of petals.
Non-Essential Elements. (Perigone or Perianth)	(4) Calyx consisting of sepals.

Complete Flower.—A flower which consists of all four elements, viz.: Calyx, corolla, androecium and gynæcium, is said to be a Complete Flower.

Symmetrical Flower.—If we examine a number of common flowers, as *Allium*, *Oenothera* (Fig. 76), *Geranium*, etc., we observe that the number of the different elements is like the following:

	Sepals.	Petals.	Stamens.	Pistils.
<i>Allium</i>	3	3	6	3
<i>Oenothera</i>	4	4	4	4
<i>Geranium</i>	5	5	10	5

It requires but a slight mathematical disposition to see at once that there is a ground-plan upon which the ele-

further divided into: (I.) *Actinomorphic* and (II.) *Zygomorphic*.

(I.) *Actinomorphic* being such as can be bisected into similar halves in two or more planes, as in Fig. 76 of *Oenothera*.

(II.) *Zygomorphic* Flowers being such as can be bisected in only one plane into similar halves. Three kinds occur:

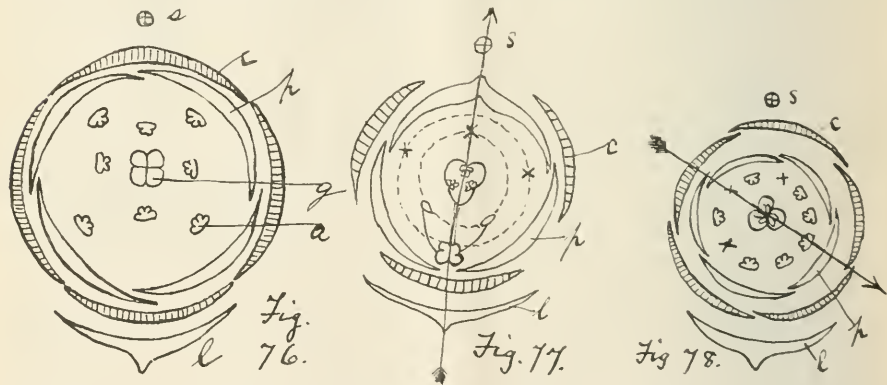
(1) Median Zygomorphic, when the plane of section corresponds to the median, as in the *Orchidaceæ* (Fig. 76).

(2) Oblique Zygomorphic, when the plane of section cuts the median at an acute angle, as in *Horsechestnut* (*Æsculus Hippocastanea*). See Fig. 78.

(3) Transverse Zygomorphic, when the plane of section cuts the median at right angles, as in *Corydalis* and other *Tumariacæ*. (See Fig. 79.)

Regular Flowers are those in which all of the same elements are alike in shape, as in *Geranium*, *Oenothera*, etc.

Irregular Flowers are those in which all of the same elements are not alike in shape, as in *Violets*, *Pea*, *Lavender*, etc.



ments in these and other flowers are arranged. If we examine a flower with three sepals we observe that the remaining elements are in number either three or some multiple of three. A flower of four sepals has all its parts arranged in either four or some multiple thereof, etc. As a rule the number of stamens is some multiple of the number of any of the other elements. This ground plan is spoken of as the "numerical plan" of the flower, and when it is perfectly carried out, as in the illustrations given above, the flower is said to be symmetrical. A symmetrical flower is a complete flower in which all of the elements are arranged in cycles and the number of members in each cycle is the same. According to the Germans, "a symmetrical flower is one that can be vertically divided into two halves, each of which is an exact reflex image of the other." They are then

Diocious Plants are those like the willows, where the staminate and pistillate flowers are borne upon separate plants.

Monœcious Plants have the staminate and pistillate flowers upon the same plant, as in *Quercus alba*, *Ricinus communis*, etc.

The following signs are used in systematic botany to distinguish pistillate and staminate flowers:

- ♀ for Pistillate Flowers.
- ♂ for Staminate Flowers.

These two signs can easily be remembered and distinguished from each other by the following suggestion coming from an esteemed and lamented teacher, Prof. Dr. Emily L. Gregory, viz., that the sign for the pistillate flower may be likened to a hand mirror, and as

Fig. 76.—Diagram of an actinomorphic flower of *Oenothera*. The positions of parts of the flower are shown with reference to the position of stem (s) and leaf (l). (p) Whorl of four sepals; (pi) whorl of four petals; (st) two whorls of stamens of which there are four in each; and (c) gynæcium, consisting of four united ovaries. Note that this flower is peculiar in that all of the outer row of stamens are directly opposite the petals.

Fig. 77.—Diagram of a median zygomorphic flower of *Orchis*. The letters have the same significance as in Fig. 76. The X-shaped signs indicate the loss of stamens. But one of the outer and two of the inner circle of stamens are developed, and these are united. The stamens are further united with the pistil.

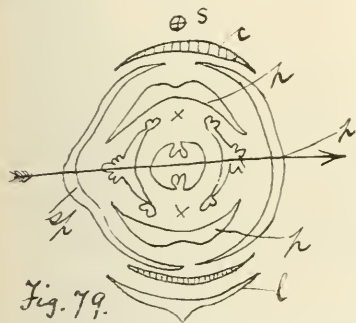
Fig. 78.—Diagram of an oblique zygomorphic flower of *Horsechestnut*. (*Æsculus Hippocastanea*.) The letters have the same significance as in Fig. 76.

women are supposed to spend more of their time in this way than men, it might be used to distinguish it from the staminate sign.

Besides the terms already employed, Darwin distinguishes plants further, as follows:

Polygamous, when the species bears both unisexual and bisexual flowers.

Gynodioecious, when the species bears pistillate and bisexual flowers on separate plants.

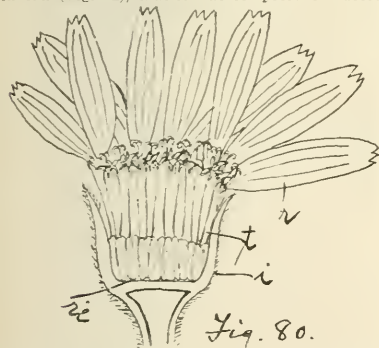


Androdioecious, when the species bears staminate and bisexual flowers on separate plants.

Gynomonoecious, when the species bears pistillate and bisexual flowers on the same plant.

Andromonoecious, when the species bears staminate and bisexual flowers on the same plant.

Torus or Receptacle.—If the elements of a flower are nothing more than modified leaves it is apparent that there must be an internode between each two leaves. This is not so easily made out by the naked eye, but becomes almost as marked on cutting a section through some flowers as it was seen in the section of the bud of black oak (Fig. 21), that it was composed of successive

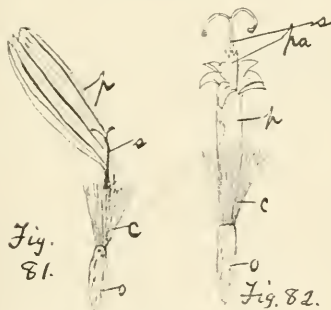


phytomers. Now, this portion of the stem in which the internodes are so reduced and from which the elements of the flower arise is called the *Torus or Receptacle*.

Involute.—Now, just as we find flowers consisting of one or more elements borne upon a receptacle, so nature may go a step further and have a great many flowers arising from a single receptacle. Such a collection of flowers is spoken of as a Compound Flower, as in the N. O. Composite, to which belong *Matricaria*, *Anthemis*,

Arnica (Fig. 80), *Sunflower*, *Dandelion*, etc. In all of these illustrations cited we have a large receptacle subtended by a number of scale-like leaves or bracts—called in the case of Compound Flowers an *Involute*.

Compound Flowers.—The flower head of the N. O. Composite (Fig. 80) may consist of two different kinds of flowers. They receive different names because of their shape and position. Those situated upon the edge are called "*Ray Flowers*" (Fig. 81). The same flowers possess more or less strap-shaped corolla and hence are called "*Ligulate Flowers*." So that the terms "*Ray Flowers*" and "*Ligulate Flowers*" are synonymous. Those flowers situated upon the inside of the Ray Flowers upon a more or less disc-like receptacle, are termed "*Disc Flowers*" (Fig. 82). These Disc Flowers possess a more or less tubular-shaped corolla and are therefore called "*Tubular Flowers*" also. So that again the terms Disc Flowers and Tubular Flowers are synonymous. Some illustrations of plants of the N. O. Composite possessing ligulate flowers only, are *Taraxacum*, *Actioricum*, etc. Among those that possess both ligulate and tubular flowers we have *Helianthus* (or *Sunflower*), *Chrysanthemum* (or *Daisy*), *Matricaria*, *Arnica* (Fig. 80), *Erigeron*, *Soli-*



dago, *Eupatorium*, *Grindelia*, etc. Those with tubular flowers only are fewer, as *Baccharis* (Groundsel-tree), etc.

Peduncle and Pedicel.—The flower stalk of a single flower or a collection of flowers is spoken of as being a *Peduncle* (Fig. 83). By this is understood the elements produced on a modified branch, whether these go to form one or more flowers. Of course, when a number of flowers are produced, as in *Phytolacca* (Fig. 83), etc., the stalks of the individual flowers cannot be termed a *Peduncle*, as this is already applied to the stalk which bears the collection of flowers, so that another term is necessary. The term *Pedicel* (Fig. 83) is given to the stalks of the individual flowers that are borne on a *Peduncle*.

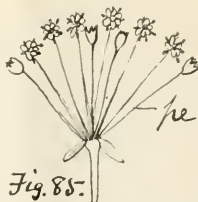
Anthotaxy or Inflorescence.—If we compare flower clusters or inflorescence of, say, a morning glory (Fig. 88), with that of a poke weed (Fig. 83), we observe that in the former the number of flowers that may be produced is determined by reason of the fact that the middle of the group of buds matures first. There is no possibility here for a continuation of the axis on which the flowers are borne. In the poke weed, on the other hand, we observe that the end of the modified branch has not only a great many flower buds but that as some

Fig. 79.—Diagram of a transverse zygomorphic flower of *Corydalis*. The letters have the same significance as in Fig. 76; one of the petals (sp) is spurred. The stamens are in two sets of three each.

Fig. 80.—Longitudinal section through a head of *Arnica*. (t) *Involute*; (re) receptacle; (r) ray flowers; (t) tubular flowers.

Fig. 81.—Ray Flower of *Arnica* isolated. (o) Ovary; (c) calyx adherent, but upper portion divided by chorisis into a fringe and called a pappus; (p) strap-shaped corolla; (s) style with two-cleft stigma.

Fig. 82.—Isolated Disc Flower of *Arnica*. Letters have the same significance as in Fig. 81, with the exception that the united anthers (p) project beyond the corolla-tube.



develop, others are formed. There is, in other words, "no telling" how long the inflorescence may be, i. e., the number of flowers that may be produced is indefinite. In order to express these two forms of inflorescence the terms *Indeterminate* or *Indefinite Inflorescence* (*Anthotaxy*) is applied to all flowers that manifest a similar mode of growth to that of the poke weed, whereas flowers like those of the morning glory are of the *Determinate* or *Definite Inflorescence* (*Anthotaxy*) order.

Indeterminate or *Indefinite Inflorescence*.—If we compare the flower-clusters of *Phytolacca*, *Cherry*, *Onion*, *Plantain*, *Sunflower*, we observe the following distinct forms of *Indeterminate* or *Indefinite Anthotaxy*:

Raceme.—In poke weed (*Phytolacca decandra*) we observe about sixty flowers arranged along the continuation of the peduncle and called *Rhachis* (Fig. 83). Each flower has its own pedicel and they are all about the same size. Such a mode of inflorescence, which we also observe in the *Convallaria*, *Currant*, etc., is called a *Raceme*.

Corymb.—In the cultivated cherry we observe that the *Rhachis* is shorter than in the *Raceme*, but in addition the pedicels of the flowers are elongated to such an extent that all of the flowers reach the same height. An inflorescence of this kind is called a *Corymb* (Fig. 84).

Umbel.—In the onion we observe that the pedicels all start from apparently the same portion of the stem (Fig. 85). This differs from any of the preceding forms in that the internodes between the flowers have been reduced to such an extent that the flowers arise from the receptacle. A similar form of inflorescence is observed in the milkweeds and is called an *Umbel*.

Compound Umbel.—In Caraway and other Umbelliferae, additional flower-like clusters in place of each flower arise. This is called a *Compound Umbel*.

Spike.—In the Plantain (*Plantago major*) we observe that the *rhachis* is present, but the individual flowers have their pedicels so shortened that the flowers rest directly on the *rhachis* (Fig. 86). This form of inflorescence is called a *Spike*.

Head.—In the Sunflower and other *Compositæ* (Fig. 80), the flowers are borne directly on the receptacle. In the *Compositæ* the inflorescence is subtended by an involucre, whereas in *Clover*, *Cephalanthus*, etc., the inflorescence is destitute of any. Such an inflorescence, as in the *Button-bush* (*Cephalanthus*) or any *Compositæ*, is spoken of as a *Head*.

Catkin.—In the willow, birch, etc., we find a spike, with this peculiarity, that scaly bracts are produced at the base of the individual flowers. Such a form of inflorescence is spoken of as a *Catkin* or *Ament*.

Fig. 83.—Diagram of the Raceme Inflorescence in Poke (*Phytolacca decandra*). (p) Pedicel of the inflorescence; (pe) pedicel or stalk of individual flowers; (b) bracts or modified leaves; (r) rhachis, being the axis of the inflorescence.

Fig. 84.—Diagram of a Corymb as illustrated in the Cherry Inflorescence. The letters have the same significance as Fig. 83.

Fig. 85.—Diagram of an Umbel as found in Onion, Milkweed, etc.

Panicle.—In Cuscuta we observe a compound raceme, i. e., instead of producing but single flowers along the *rhachis*, additional clusters of flowers are produced in place of each flower. Such an inflorescence is called a *Panicle* (Fig. 87).

If we examine the flower clusters of the morning glory, dogwood, heliotrope, peppermint, we observe different forms of *Determinate* or *Definite Inflorescence*.

Cyme.—Whenever the main axis of the stem or its branch is terminated by a flower, the inflorescence is spoken of as being *cymose*. In its simplest case a stem terminated by a single flower is a *cyme*. In the morning glory (Fig. 88) we have a *cymose inflorescence* consisting of three to five flowers.

Compound Cyme.—Whenever the pedicel of a *cyme* becomes a peduncle it passes from a simple to a compound *cyme*, as in *Elder*, *Hydrangea*, *Viburnum*, etc.



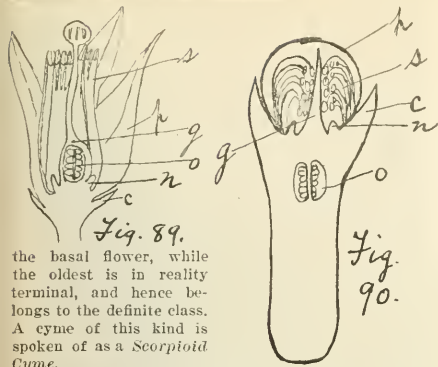
Glomerule.—In the Dogwood (*Cornus Florida*), we observe that while the flowers are in a head, nevertheless it is the one at about the center that opens first. The inflorescence is therefore of the *definite class*. An inflorescence of the *definite class* in a compound flower is spoken of as a *Glomerule*.

Scorpioid Cyme.—In the Heliotrope, Forget-me-not, etc., the inflorescence somewhat resembles a raceme, but

Fig. 86.—Diagram of a spike of the common Plantain. The lower flowers have gone to fruit; the middle ones are maturing stamens; while the upper ones are in bud.

Fig. 87.—Diagram of a Panicle as illustrated in Yucca, Brayera, etc.

Fig. 88.—Cymose Inflorescence in Morning Glory. (f) Young fruit; (b) bud; (ff) flower; (pe) pedicel.



the basal flower, while the oldest is in reality terminal, and hence belongs to the definite class. A cyme of this kind is spoken of as a Scorpioid Cyme.

Verticillaster.—In Peppermint, Catria, Marrubium, etc., the inflorescence in the axils of the leaves is a glomerule. The name Verticillaster is given to forms of inflorescence of this kind, which is characteristic of many plants of the N. O. Labiate.

PRÆFLORATION OR ÆSTIVATION.

Valvate and Convolute Præfloration.—The arrangement of the elements of the flower, more especially the Perigone in the bud, is termed Præfloration or Æstivation. The arrangement is characteristic for each species. The sepals and petals do not necessarily possess the same arrangement. In *Enothera* species, for instance, the parts of the sepals meet each other at the edges. Such a præfloration is spoken of as being Valvate. In the petals, on the other hand, of *Enothera*, we have each one overlapping a petal and at the same time being overlapped by another. The position is such that they are rolled up also. Such a form of Præfloration is called Convolute. This Valvate Præfloration of sepals and Convolute Præfloration of petals is quite characteristic of all of the plants of the Evening Primrose family (N. O. Onagraceæ).

Imbricated Præfloration.—In other plants, as in species of geranium, the sepals overlap each other at the edges much like the tiles on a roof. The term Imbricated Præfloration is used to indicate this form.

Plicate or Plaited Præfloration.—In some flowers, as gentiana, datura, convolvulus, etc., which have the calyx or corolla united more or less into one piece, we find the united portions of the tube more or less folded over each other, whence the name Plicate or Plaited Præfloration.

Crumpled Præfloration.—In *Cistus*, *Punica*, etc., the petals are irregularly folded. Such a præfloration is spoken of as being "Crumpled."

MODIFICATIONS OF THE FLOWER.

Cohesion.—We have already seen that the different elements of the flower are arranged approximately in circles. The number in each circle varies generally between three and five. In some cases the parts of the same circle are united to each other, i. e., all of the sepals or all of the petals of a circle are united. This condition is spoken of as Cohesion or Coalescence of sepals, petals, etc.

Adhesion.—Now, instead of union of similar parts there can be union of dissimilar elements, as calyx with corolla, or corolla with stamens, etc. This kind of union is spoken of as Adhesion or Adnation.

Fig. 89.—Vertical section through Orange flower. The calyx (c), corolla (p), and stamens (s), are hypogynous, i. e., situated underneath the ovary (o). The latter is superior. (n) A nectar-secreting hypogynous disc.

Fig. 90.—Vertical section through a flower bud of cloves (commercial cloves). The calyx (c), corolla (p), and androeceum (s), are all borne upon the ovary (o), i. e., are epigynous. The ovary is inferior. (n) A nectar-secreting disc.

Hypogynous (Superior Ovary).—In the cherry and rose we observe a cohesion of the parts of the calyx and adhesion between corolla, stamens and calyx. The result is that the corolla appears to be borne on the calyx and the stamens on the corolla. If we examine the flowers of the flax or orange (Fig. 89), we observe that the stamens, petals and sepals are borne upon the receptacle, i. e., underneath the pistil. Such an insertion of elements as we find here is spoken of as hypogynous. The ovary is really "free" from any adhesion to any of the elements of the flowers. Such an ovary is further said to be "superior."

Perigynous.—We have already noted that in the flowers of rose and cherry the ovary is free or superior, and that the calyx only is hypogynous. The insertion of the petals and stamens is upon the calyx and around the pistil. Such an insertion is spoken of as being Perigynous—meaning literally, around the pistil.

Epigynous (Inferior Ovary).—In some flowers, as in the Cloves (Fig. 90), there is adhesion between all of the circles, so that the stamens, petals and sepals all seem to stand on the ovary or arise therefrom. Such an insertion of elements is spoken of as being Epigynous (upon the pistil). Now, in contradistinction to the ovary of the orange or flax, the ovary of cloves is hidden, and the calyx and other elements are really superior; the ovary is inferior. An inferior ovary conveys at once the idea of the adnation or adhesion of the other parts to it, while a superior ovary is free from such adnation.

Disc.—In addition to pure adhesion among the different elements of the flower there is in the orange flower (for instance), directly under the pistil (Fig. 89), a large, ring-like bolster that might be considered a prolongation of the stem underneath the pistil. This is in fact what we really have. Such a development is ordinarily considered to arise from the receptacle and is spoken of as a Disc. Now, a disc is nothing other than an extra development of some part or portions of the flower for the purpose of attracting animal life to assist in cross-fertilization, which we shall briefly speak of later. It may possess nectar-secreting hairs also.

Hypogynous Disc.—A disc which is situated below the ovary, as in the orange, is said to be hypogynous, just as the three other elements are designated as being hypogynous, viz., calyx, corolla and stamens.

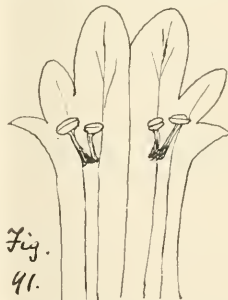


Fig. 91.



Fig. 92.

Perigynous Disc.—In species of *Rhamnus* there is a ring-like, fleshy development arising from the base of the ovary and extending some way around it, but not adhering to it. Such a disc is said to be perigynous.

Epigynous Disc.—In some other plants, as in N. O. Umbellifere, there is adnation of all of the parts of the flower, and a disc between the stamens and ovary, which causes adhesion of stamens and pistil. Such a disc,

Fig. 91.—Corolla of Lavender spread open. Stamens are didynamous.

Fig. 92.—Flower of Mustard dissected so as to show the tetradynamous stamens.

because of its apparent insertion above on the ovary, is said to be Epigynous. See also an Epigynous disc in cloves (Fig. 90).

Metamorphosis.—Upon comparing a large number of flowers of water-lilies with those of cultivated and wild roses, a transformation or metamorphosis is apparent. In the flowers of the water-lily the petals are metamorphosed to stamens; whereas in comparing the wild rose with cultivated rose there is observed a change of the stamens in the former to petals in the latter. In other words, in the one case there is a change of a non-essential element to an essential element, and in the other a transformation of essential elements to the non-essential.

Progressive Metamorphosis.—The change as it is seen in the water-lily is one that indicates a movement on the part of the plant that is in the line of progress, and hence is termed Progressive Metamorphosis.

Retrograde Metamorphosis.—In the cultivated rose there is apparently no progressive movement on the part of the plant, so far as its own individuality is concerned. It is not generally regarded as a sign of progress where an essential element loses its function and is transformed to a non-essential element. There is this to be said however: Some plant individuals may be aware that under cultivation they will live and their progeny provided for far more satisfactorily than under the conditions of nature. Take the rose as an illustration—see how widely it is disseminated and cared for, and there can be no question of its future. Of course, if allowed to grow wild, it will revert somewhat to what it was originally in nature.

Retrograde Metamorphosis is observed in all of the "double flowers" of the florist, as "double buttercups," "double roses," etc.

Chlorosis or Chloranth.—The process of retrograde metamorphosis when complete, extends as far as the change of pistils into petals, as in fully double buttercups. The petals even may become green and leaf-like as in "green roses," "green strawberries," etc. This change of the flower to green-leaf elements is called "Chlorosis" or "Chloranth."

There is further retrograde metamorphosis observed in some flowers in that the ovules are reverted back to something which indicates their origin. In the Sundew flowers the carpels have opened and in place of ovules glandular tentacles have been seen, indicating their development from leaves. In the clover the ovules are sometimes replaced by leaflet-like structures on the margin of the carpel. In *Salix caprea* there has been a sim-

ilar development observed, as that noted in clover, but the leaflet-like structure was pinnatifid.

Abortion and Suppression.—In the water-lily and the rose we have observed an increase in one kind at the expense of decrease in another. Now, there can be increase and decrease in the number of parts for other reasons. *Decrease* of parts may be due to *Abortion* or *Suppression*, and *Increase* of parts may be due to *Chlorosis* or *Deduplication*. Abortion and Suppression are by no means synonymous in botanical language. By abortion is meant the partial loss of an element, whereas suppression means the total loss. Instances of abortion are to be observed in Catalpa and Penstemon, etc. In Catalpa there are but two perfect stamens and the vestiges of three others. In Penstemon but one of the five stamens is partially gone. There are many instances of suppression in plants of the *N. O.* Labiate, etc. In *Mentha piperita*, *Lavandula vera* (Fig. 91), etc., there are only four stamens present, one being entirely suppressed.

Chlorosis or Deduplication.—By this is meant the division of one element into additional elements. Illustrations of chlorosis are quite numerous. In the orange blossom (Fig. 89), for instance, we find that single stamens have divided to produce anywhere from three to eleven stamens. In the petals of the orange, chlorosis is at work, so that instead of but five petals being present there are frequently as many as eight. In species of *Hypericum* there are from three to five groups of stamens, each group containing as many as four to five stamens. In *Corydalis* and *Dicentra*, each of the two stamens has increased by division to produce three in each group. In species of *Stellaria* the two-cleft character of the petals indicates no doubt the beginning of chlorosis. In *Drosera pifformis* there is a triacarpellary ovary with six styles and stigmas. This indicates a chlorosis among styles and stigmas.

In the plants of the *N. O.* Cruciferae (Fig. 92), Dr. Gray supposes that there is an exhibition of chlorosis in the four long stamens. The flowers of this order would be 4-merous but for the fact of the presence of six stamens. Some have supposed that two stamens were aborted. But it may be that by the division of two stamens an addition of two was produced. This theory of Dr. Gray is as plausible as the one of supposing abortion to have taken place.

In the American Linden we observe the stamens united into groups, among which is a petaloid development. Dr. Gray supposes all of the additional elements (stamens and petaloid development) to have arisen by the chlorosis of a single stamen.

CREOSOTE BY INUNCTION.—When for any reason it is advisable to administer creosote by inunction, the following modification of Valentin Gilbert's ointment may be used:

℞ Creosoti	5 iss
Lanoline	
Adipis. prep.	
Ol. Olive	aa 3 iss

PREPARATION AND COATING OF PILLS.

From a number of experiments made, Havasse (Jour. de Ph. de Liege) draws the following conclusions: (1) If the excipient contains wax, it must not be present in so great a quantity as to raise the melting point of the mixture above the temperature of the stomach. The maximum quantity of wax is 1 part to 10 parts of active substance. (2) Pills intended to be keratinized should not be made with ordinary excipients. (3) Coating and excipient should be such as to permit ready solution or disintegration of the pills in the gastric fluid. (4) In cases where the preceding conditions cannot be fulfilled, it is better to abandon the pill form and administer the remedy in capsules or wafers.

INCOMPATIBILITY OF CALOMEL WITH CHLORIDES, ACIDS AND ALBUMINOIDS.—The alleged incompatibility of these substances has been disproved by Jovanne (Sem. med.), who found by test-tube experiments that calomel is not changed into corrosive sublimate either by chlorides, inorganic or organic acids. Further experiments on dogs showed no mercury poisoning. Calomel was also administered to sixty children, with lemonade containing hydrochloric, citric or tartaric acid, with broth containing salt, and with orange juice, milk, etc., without the slightest disturbance ever being noticed.—(Ph. Rundschau.)

BREATHING IN ROOMS FILLED WITH NOXIOUS GASES.—This matter is of particular interest to the pharmacist, as the breaking of a bottle of nitric acid or other liquid giving off poisonous gases sometimes happens in badly ventilated cellars of drug stores. A contrivance called "Pneumatophan" has been devised, which enables a person to enter such rooms without danger. A bag containing oxygen gas is connected by a tube with the mouth, the supply of the gas being derived from a small cylinder of liquid oxygen. Breathing in this manner may be continued for hours without much inconvenience.—(Südd. Ap. Ztg.)

A PROPOSED NEW METHOD OF EXAMINING PEPSIN.*

By ALFRED H. ALLEN.

At the present time the subject of pepsin-assaying is in a very unsatisfactory condition, for reasons which it is unnecessary to capitate. There has commonly been no marked distinction drawn between the mere conversion of albumin into syntonin or other soluble form and the true peptonization characteristic of the action of pepsin, both these changes being confounded under the term "digestion." Further, the influence of the hydrochloric acid used in effecting solution of the albumin has been generally ignored or considered insignificant, whereas it has been shown by Mr. L. A. Harding that a material part of the solvent action observed is really due to the acid employed, and hence should be duly allowed for before coming to a conclusion as to the strength of the sample of pepsin under examination. But the acid, under the ordinary conditions of a pepsin assay, only converts the albumin into syntonin, the peptonization of this product being due to the pepsin. Hence, as admitted by various authorities, the true gauge of the activity of a sample of pepsin is the amount of peptones, or of mixed peptones and albumoses, formed by its action under specified conditions. These facts have been pointed out and insisted on by Mr. J. H. Stebbings (Analyst, 1889, pp. 197, 210, 229), who, in an able criticism of the existing methods of assaying pepsin, recommends a process of Kremel, which allows of the actual determination of the amount of digestion products formed, and presents other advantages over the methods commonly employed.

Kremel's process, however, does not allow of any distinction being drawn between the albumoses formed and the true peptone, which is the peculiar and characteristic product of proteolysis by pepsin. Until recently, the determination of the actual peptone formed in digestion experiments was troublesome and uncertain, but I believe that, by the application of a new process recently devised by me in conjunction with Mr. A. B. Searle (Analyst, 1897, p. 259), this difficulty has been in a great measure overcome, and that of the rational testing of pepsin has been brought within the range of practical possibilities. The method is based on a reaction which suggested itself to me as an improvement on a plan of precipitating proteids recently proposed by Rideal and Stewart (Analyst, 1897, p. 228). Their method consists in passing a current of chlorine gas through the solution to be tested, filtering off and washing the resultant precipitate, and weighing it after drying at a temperature not exceeding 70° C., or preferably in vacuo over sulphuric acid. The precipitate is stated to be remarkably stable at ordinary temperatures, but to be readily decomposed on heating, becoming black and rotting the filter-paper. In order to avoid the inconveniences attaching to the use of chlorine gas, and the drying and weighing of an unstable precipitate, we employ bromine-water as the precipitant, in place of chlorine¹. The precipitate is filtered through asbestos, treated with strong sulphuric acid while still moist, and the contained nitrogen determined by Gunning's modification of Kjeldahl's process. The following are the details of the method as employed by us:

A quantity of the solution, containing about 1 gramme of the albuminoid matter, is diluted with cold water to a volume of about 100 Cc., and treated in a conical beaker with sufficient hydrochloric acid to render the liquid distinctly acid to litmus. Bromine water is then added in

considerable excess, and the liquid stirred vigorously for some time. The yellowish precipitate which separates is at first flocculent, but becomes more viscons on stirring, and finally adheres in great part to the sides of the beaker. When this occurs the liquid is allowed to stand at rest for about half an hour, or until the precipitate has settled. It is then decanted through a filter².

The precipitate adhering to the sides of the beaker is washed several times with cold distilled water, the washings being poured through the filter. Occasionally, when the greater part of the free bromine has been washed out of the precipitate, the liquid does not filter clear. It is therefore advisable to keep the washings separate from the filtrate, and, if necessary, to add bromine or sodium sulphate to the wash water.

The contents of the filter tube (including the asbestos and, if necessary, the glass-wool) are returned to the beaker used for the precipitation, 20 Cc. of strong sulphuric acid added, and the beaker covered with a watch-glass and heated over wire-gauze. The substance charrs and bromine vapor is evolved. When frothing has ceased, about 10 grammes of powdered potassium sulphate should be added, and the liquid boiled vigorously until colorless. It is then allowed to cool, diluted with water, an excess of caustic soda added, the ammonia distilled off, and the distillate titrated with standard acid. From the nitrogen found the amount of proteid or gelatinoid body present is deduced by a suitable factor. Where Kjeldahl's method cannot be conveniently employed, the precipitate produced by bromine might be dissolved in hot alcohol of 97 per cent. (about 50 Cc. will suffice), the solution evaporated to dryness at 100° C., and the residue weighed. The weight found, multiplied by 0.87 will give that of the corresponding peptone.

As the results of experiments detailed by us in the original paper (Allen and Searle, Analyst, 1897, p. 259), it was found that practically the whole of the nitrogen of gelatin, gelatin-peptone, egg-albumin, syntonin, and the mixed products of the acid-pepsin digestion of egg-albumin was thrown down in the precipitate produced by bromine. In the case of syntonin, equally good results were obtained, whether the acid used for conversion of the egg-albumin was left unneutralized or was exactly saturated by caustic soda; but if the solution was made alkaline and bromine then added, the proteid could not be completely precipitated by subsequent free acidulation of the liquid. The mixed peptones formed by the acid-pepsin digestion of the white of hard-boiled eggs were also completely precipitated by bromine.

On the other hand bromine produced no precipitate in acidulated solutions of urea, creatine, creatinine, asparagine, or aspartic acid. A meat extract prepared by soaking raw beef in ten parts of cold water, straining, boiling and filtering from the coagulated albumin, gave only a trifling precipitate on addition of bromine-water. In the liquid concentrated to one-tenth a larger precipitate was obtained, the greater part of which dissolved on diluting the liquid with an equal measure of water, and almost the whole on addition of a few drops of hydrochloric acid. On the other hand, the complete precipitation of albumin and gelatin by bromine seemed to be quite unaffected by dilution or the presence of free hydrochloric acid.

In applying the bromine process to the examination of the products of proteolytic digestion, it is conveniently combined with the Bömer method of precipitating all proteids but peptones by saturating the solution with zinc sulphate. From the filtrate the true peptones can be precipitated by bromine, while all basic and amido products of the digestion remain in solution. The process

*Reprinted from Pharmaceutical Journal.

¹I have just become aware, from a preliminary paper, of which the substance was communicated to the Physiological Society on June 10, 1897, that Messrs. F. Gowland Hopkins and F. W. Brook have recently been independently studying the precipitation of proteids by bromine. They find the precipitate from solution of egg albumen to contain a very constant proportion of bromine, the mean being 14.89 per cent. Their results present many points of theoretical interest, and form a valuable complement to those described by us in the Analyst.

²The filter is made by placing a plug of glass-wool in a cylindrical funnel (constructed of a vertical glass tube drawn out at the lower end), and covering it with a pad of pulped asbestos. If the filter be properly constructed, no water-pump will be required and a perfectly clear filtrate will be obtained.

has been devised too recently to allow of any extended experience of its working, and some modifications of its details may be found desirable, but the following is the method as the author employs it at present: About 1 gramme of egg albumin in scales is powdered and treated in a 100 Cc. flask with 20 Cc. of warm water. When the albumin has dissolved, the liquid should be heated in a bath of boiling water to coagulate the albumin, and cooled to a temperature not exceeding 40° C.; 0.100 gramme of the sample of pepsin to be tested should next be added, followed by 25 Cc. of decinormal hydrochloric acid. The liquid is then warmed to 40° C. and kept at that temperature for three hours. A volume of decinormal sodium carbonate, exactly equivalent to the acid previously used; is then added, and the liquid heated on the water bath to 90° C. for ten minutes. It is then cooled, diluted with water to 100 Cc., and passed through a dry filter. The precipitate will consist of syntonin and any unaltered albumin, while the filtrate contains any albumoses and peptones formed. Fifty Cc. measure of the filtered liquid is now saturated in the cold with powdered zinc sulphate (of which about 60 grammes will be required), allowed to stand, with occasional agitation, for half an hour, and then filtered. The filtrate³ is acidulated with hydrochloric acid, and treated with an excess of bromine water. The precipitate is treated as already described, and the peptone formed deduced from the nitrogen found by Kjeldahl's process. An allowance must be made for the nitrogen contained in the pepsin employed. The albumoses may be deduced from the nitrogen found in the zinc precipitate, after washing it with a saturated solution of zinc sulphate. They may also be deduced from the nitrogen found by treating the remainder of the filtrate from the coagulated syntonin, etc., by Kjeldahl's process, either with or without precipitation with bromine.

The following results were obtained by the above process:

	With acid alone.	With acid and pepsin.		
	Nitrogen.	$\times 6.3 =$ Proteid.	Nitrogen.	$\times 6.3 =$ Proteid.
Total, by Kjeldahl's process on albumen used.....	.0086	.621	.0085	.621
Total, by Kjeldahl's process on pepsin used.....	.....	.....	.0106	.667
Total.....	.0086	.621	.1082	.688
A. Uncoagulated albumin (altered off).....	.0722	.455	Trace.	Trace.
B. Syntonin (precipitated on neutralizing and boiling).....	.0264	.166	.0387	.244
C. Soluble proteids (by bromine in portion of filtrate from syntonin).....	.....	Trace.	.0704	.444
D. Peptones (by Br in filtrate from ZnSO ₄ precipitate).....	.....	None.	.0470	.296
E. Albumoses plus pepsin (by difference).....	.....	Trace.	.0234	.147
F. Albumoses (corrected for pepsin).....	.....	Trace.	.0128	.080
Sum of proteids (exclusive of pepsin), i. e., A, B, D, and F.....	.0086	.621	.0086	.620

One gramme of commercial egg albumin in scales was used with 0.100 gramme of pepsin. The digestion was conducted at 40° C., and continued for three hours, though in the experiment in which pepsin was used all the albumin had dissolved in about an hour and a half.

In its analytical characters pepsin closely resembles the albumoses. Thus it is not precipitated by acids, nor by potassium ferriyanide in presence of acetic acid, but it is completely precipitated by saturating its solution with zinc sulphate.

The following results were obtained when the sample of pepsin used was analyzed by the bromine process:

	Nitrogen per cent.	$\times 6.3 =$ Proteids per cent.
Total, by Kjeldahl's process on original pepsin.....	10.57	66.59
Precipitated by bromine (on original pepsin).....	10.12	63.63
By Kjeldahl, in filtrate from bromine precipitate.....	0.44	2.77
Precipitated by zinc sulphate (on original pepsin).....	6.60	61.02
By bromine, in filtrate from zinc sulphate precipitate.....	0.70	4.41
By Kjeldahl, in filtrate from bromine precipitate.....	0.14	0.88
Precipitated by acetic acid and potassium ferriyanide.....	None.	None.

The precipitates produced by bromine did not settle or adhere to the sides of the beaker nearly so readily as usual. Hence it was found impossible to obtain perfectly clear filtrates, the residual nitrogen in which was accordingly determined by Kjeldahl's process.

In addition to proteid matters, the sample contained 1.00 per cent. of ash and 5.00 per cent. of moisture, the remainder being milk-sugar.

I am uncertain what amounts of pepsin and albumin will be found best to work with in practice, but I think complete solution of the albumin is an essential condition of a trustworthy assay.

It is well known that in pepsic digestion the process of proteolysis stops at the production of peptones, whereas in tryptic digestion only the antipeptone resists further changes, the hemipeptone readily splitting up with formation of tyrosine, leucine, lysine, and other crystallizable non-proteid products.

The following results illustrative of tryptic digestion were obtained in my laboratory by Mr. Searle. Scale egg-albumin was dissolved, coagulated, and digested for three hours with a glycerine extract of pancreas, in presence of sodium bicarbonate:

	Nitrogen.	$\times 6.3 =$ Proteid.
By Kjeldahl's process on albumin used.....	.0086	.621
By Kjeldahl's process on pancreatic extract used.....	.0100	.663
Undissolved matters (unchanged albumin and anti-albumin).....	.1086	.684
Precipitated from filtrate by zinc sulphate (deutero-albumose).....	.0227	.143
By bromine from filtrate from zinc sulphate precipitate (peptones).....	.0290	.183
Unprecipitated either by zinc sulphate or bromine (tyrosine, leucine, etc.).....	.0210	.132

No precipitate was produced by treating the filtered product of the digestion with acetic acid and potassium ferriyanide, proving the absence of acid and alkali albumin.

HOW TO RAISE MUSHROOMS.—No family that cares to take the trouble need be without fresh mushrooms the year around, if they have room in the kitchen or anywhere else around the house, for an old bureau or chest of drawers which can be used as a cultivating bed. The writer, (Nat. Dr.) for several years, kept such a cultivator in an unused room of his house, and was rarely without his fresh champignons for breakfast. The arrangement is as follows: Fill the drawers, to the depth of 6 or 8 inches, with an intimate mixture of good, rich soil, and old, dry horse or cow dung, in equal parts. Having done this, procure from your dealer in seeds, etc., some fresh mushroom spawn (the French is the best), and insert it at various points on the surface of the soil. Sprinkle (not too heavily) the surface, and the beds are ready. If the drawers close tightly in front, the back of the stand should be removed, and a curtain tacked up in such a manner as to shut out the light. The mushrooms will begin to show themselves plentifully in a few days, but it will be a fortnight before any, fit to eat, can be gathered. The bed will last, with an occasional watering, for many months, and furnish almost daily a good mess of champignons.

³The precipitate produced by zinc sulphate may be washed with a cold saturated solution of the precipitant, and the whole of the filtrate acidulated and treated with bromine. A preferable plan is to weigh the liquid containing the precipitate formed by zinc sulphate, pass it through a dry filter, and weigh the filtered liquid before adding acid and bromine. The result obtained on the fraction actually employed (usually about four-fifths) is then calculated to the total weight of liquid previously ascertained.

PHARMACY.

EKZEMIN is an ointment of precipitated sulphur, containing vegetable red coloring matter and perfume.

COLEY'S FLUID is a mixture of erysipelas and prodigious toxins, recommended for the treatment of tumors.

FOR INSECT STINGS the best remedy is said to be ichthyol, either in form of rubber plaster or painted on.—(Ph. Post.)

GLYCERIN-LANOLINE CREAM.—Mix 9 pt. vaseline and 13 pt. lanoline; add 12 pt. glycerin and perfume with Ylang-Ylang or rose oil.

FOR ROUGH SKIN.—Cacao butter 90 p., expressed oil of almonds 90 p., white wax 90 p., oil of lavender 3.75 p., oil of rosemary 3.75 p.

FRENCH REMEDY FOR CORNS.—Cannabis Indica 1 p., salicylic acid 10 p., oil of turpentine 5 p., glacial acetic acid 2 p., cocaine 2 p., collodion 80 p.

REMEDY FOR CHRONIC CATARRH OF THE BLADDER.—Terebinth. larc.; ext. cinch. magn. carb., aa 5 gm., to make 50 pills. Dose, 4 to 6 pills daily.

FOR CHRONIC CONSTIPATION.—Powdered rhubarb 20 p., sodium sulphate 10 p., sodium bicarbonate 5 p. A teaspoonful to be taken in a lager glass of warm water.

HAIR DYE.—A harmless hair dye is, according to "Ph. Ztg.," prepared by dissolving 4 parts pyrogallic acid, 0.3 part citric acid and 10 parts boroglycerin in 90 parts distilled water.

CLEANING FLUID FOR NICKEL PLATE.—A solution for removing spots from and brightening nickel-plated ware is made by mixing 1 part of sulphuric acid with 50 parts of alcohol.

FOR PERSPIRING HANDS.—Borax, salicylic acid, of each 15 parts; boric acid 5 parts; glycerin, dilute alcohol, of each 60 parts. The hands are rubbed with this solution three times daily.—(Ztsch. f. Ph.)

ANTIDYSENERGICUM (Schwarz) consists of pills containing myrobolans powder, pelletierin, extracts of rose and pomegranate, and gum arabic. It is employed in dysentery and chronic diarrhoea. (Ph. Rundsch.)

FOR HEMORRHOIDS, the following liniment is recommended: Fl. ext. of hamamelis, fl. ext. of hydrastis, tincture of benzoin comp., aa 4 p., tincture of belladonna 1 p., carbolized oil (5 p. c.) 8 p.—(Sem. Med.)

TINCTURE OF HORSE CHESTNUT is proposed as an infallible remedy for hemorrhoids in doses of 10 drops daily. A marked improvement is said to take place after two doses and a cure effected within a few days.—(Ph. Post.)

CREOLINUM VIENNENSE ABASICUM contains, according to Garvalowski, (Ph. Post.) phenols 25.2 per cent., resins and fatty acids 5.3 per cent., indifferent hydrocarbons 65.3 per cent., ash 0.9 per cent., and water 3.3 per cent.

TAPE WORM REMEDY FOR CHILDREN.—An efficacious and readily taken mixture, recommended in Ph. Post., consists of tamarind pulp 30 gm. (1 oz.), and kamala 6 gm. (90 grains), to be given with lemon juice in one dose.

PLASMINs are plasmatic cell fluids prepared by Buchner and Hahn from the bacilli of cholera, typhus, tuberculosis, etc. Experiments on animals as to the immunizing and remedial power of these fluids have given encouraging results. (Ph. Post.)

TO REMOVE SILVER STAINS it is recommended to moisten the spots with water and then rub them lightly with a solution prepared by dissolving 1 pt. of mercuric chloride and 1 pt. of ammonium chloride in 8 pt. of distilled water.—(Ph. Post.)

TAPEWORM REMEDY.—Alcohol 7 p., chloroform 1 p., rectified oil of turpentine 4 p., oleoresin of male fern 4 p., glycerin 15 p. Dose, one-half tablespoonful every hour; a purgative to be taken before commencing. For children half the above. (Sem. Med.)

LUNAR CAUSTIC WITH COCAINE.—To make the application of silver nitrate in sensitive places less painful, simultaneous use of cocaine nitrate is recommended. The hydrochloride is not suitable for this, as it precipitates silver as chloride.—(Ztsch. f. Ph.)

HAIR TONIC.—To prevent the hair from falling out, the following preparation is recommended to be rubbed on the scalp morning and evening: Dissolve 5 p. salicylic acid in 400 p. alcohol, add 100 p. glycerin, 100 p. tincture of soap, 30 p. balsam Peru, 70 p. Aq. coloniensis.

DEPILATORY.—Alcohol, 12 p., collodion 35 p., iodine 0.75 p., oil of turpentine 1.5 p., castor oil 2 p. This mixture is painted thick upon the places from which the hair is to be removed, during 3 to 4 days, and the film pulled off rapidly so as to take the hair with it.—(Nonv. Rem.)

ECZEMA.—

R Dermatol.	
Zinci Oxidi	aa 5.0
Lanoline	50.0

M. Sig.—Apply locally twice daily. (J. D. Ribeiro, M. D., Rio de Janeiro, Brazil.)

FOR WARTS.—(1) Concentrated acetic acid 10 parts, sulphur 20 parts, and glycerin 50 parts. Mix thoroughly. The warts are painted with the mixture daily. (2) A good remedy is stated to be a concentrated, hot solution of potassium bichromate in water, with which the warts are painted.—(Jour. de Med.)

BAY RUM.—A product of excellent quality is prepared according to Ph. Ztg., by the following formula: Tincture of Pimenta acris (1:10) 600 parts, alcohol 500 p., oil of bay 100 p., oil of pimento 1 p., oil of sweet orange 1 p., are mixed and after standing three days, 800 p. distilled water added. Upon standing a week longer the solution is filtered.

FOR CLEANING PRESCRIPTION BALANCES AND WEIGHTS, the Südd. Ap. Ztg. recommends the following, already partly known, method: Equal parts of oleic acid, water of ammonia, and absolute alcohol are mixed, and filtered after settling. The articles to be cleaned are rubbed with the mixture by means of a cloth and polished with a little powdered tripoli.

INK POWDER.—A good formula is said to be the following:

Powdered nutgall	80 parts
Crude ferrous sulphate	40 parts
Crude copper sulphate	2 parts
Gum arabic	5 parts

It is advisable to dry the ferrous sulphate thoroughly by warming before mixing. This powder keeps well when stored in a dry place.—(Ph. Ztg.)

ANUSOL SUPPOSITORIES.—A formula recommended in Ph. Ztg.:

Anusol	7.5 grammes
Zinc oxide	6.0 grammes
Balsam Peru	1.5 grammes
Cerate	2.5 grammes
Cacao butter	19.0 grammes

To make 12 suppositories. (Anusol is bismuth iodo-resorbin sulphonate.)

DETECTION OF RESIN IN WAX.—A test recommended in "Drog. Ztg." consists in extracting a sample of the wax with alcohol, which dissolves the resin along with minute quantities of wax. The alcoholic solution is evaporated to dryness and the residue boiled with nitric acid. This mixture is then dissolved in water and an excess of ammonia added. In presence of resin the solution becomes blood-red. (Ap. Ztg.)

PREPARATION OF TUBERCLE SERUM.—A recently patented process consists in injecting subcutaneously into living animals (preferably goats): (1) A specially prepared form of tuberculin; (2) a relatively large quantity of tuberculin free from glycerin; (3) a sterilized culture of tubercle bacilli, containing the dead bacilli. After a few weeks blood is drawn from the animal, which is coagulated and the serum separated.—(Ph. Ztg.)

ACTION OF HEAT ON JABORANDI.—To judge from a study by Brissemoret (Rép. de Phar.) of the physical and chemical properties of the several jaborandi alkaloids, it would seem that preparations in which no heat is used would be preferable. It was found that through the action of heat, pilocarpin, the active constituent, is split up into two compounds having entirely different physiological action, pilocarpidine and jaborine. An infusion or inspissated extract should therefore not be used.

POISONING WITH COFFEE.—A case is reported of a man 30 years old, healthy though not robust, who drank 10 to 12 large cups of black coffee daily as a stimulant. After 3 weeks he became ill with symptoms of acute intoxication; great tension of the leg and arm muscles; spasms; hallucinations; great excitement; full, though weak, pulse; weak respiration. On treatment with calomel and trional the patient improved rapidly and after a short stay at the seaside recovered completely.—(Ap. Ztg.)

CONCENTRATED SERUM-ANTITOXINS.—These are prepared according to O. Bujwid (Wien. med. Presse) by freezing. The water separates out in form of ice crystals and a brownish liquid remains. If the mixture is then thawed cautiously, two layers will be formed, the upper one colorless and nearly inactive, the lower one intensely yellow and of high antitoxic power. After two or three successive concentrations by freezing, a toxin is said to result, that represents a thousand antitoxic units in 1 to 2 ccm., and retains its full strength for more than a year.—(Ph. Centralh.)

MOUTH AND TOOTH WASHES.—French physicians prescribe one or the other of the following mixtures:

(1) Infusi salviae	250 grammes
Glycerini	10 grammes
Tinct. myrrhæ, ...	12 grammes
Lavand. aa	12 grammes
Liq. pot. chlorinatæ	10 grammes
(2) Pot. chloratis	5 grammes
Tinct. cochleariæ	25 grammes
Decoct. cinch.	200 grammes
Mel. rosat.	50 grammes
	—(Ph. Post.)

KINKELIBA LEAVES.—These leaves are obtained from *Combretum altum*, a shrub indigenous to West Africa. An infusion of them is used by the natives for bilious fever, also for colic and nausea. From the powdered fruit and oil a salve is prepared, which is applied to purulent wounds. The drug retains its activity in the dried state for several years. A chemical examination showed presence of 21 per cent. of tannin, also a considerable amount of potassium nitrate. The name Kinkeliba is from the Jesso language, which predominates in West Africa.—(Ap. Ztg.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Formula Wanted.

(E. L. S.) Dead stuck.

Removing Printer's Ink From the Hands.

(Subscriber.) Scrub the hands with a little benzine and wash with soap and water. A preliminary scrubbing with "excelsior" wet with a weak solution of caustic potassa is also effective.

Remedies For Venereal Diseases.

(R. P. C.) It is not the province of a pharmaceutical journal to give formulas and outline the treatment for venereal diseases. This duty belongs to the reputable physician who should be consulted. We cannot give the formula for the proprietary preparation.

Correspondence School of Medicine.

(O. M.) We know of no institution or school which confers the degree of M. D. upon students who take its courses in medicine by "correspondence." For an account of the Wisconsin Eclectic Medical College and its fake methods, see this journal, Nov. 12, 1896, page 641, and March 4, 1897, page 281.

Interstate Registration.

(A. M.) The Georgia Board of Pharmacy will grant registration to applicants holding certificates (by examination) from certain other boards of pharmacy. The boards of South Carolina and Tennessee do not register applicants without examination, although in the State first named, graduates of reputable colleges of pharmacy may be so registered. We suggest you write to the secretaries of the respective boards, and get your information at first hands.

Remedy For Freckles.

(W. T. C.) We think you have applied too much of the solution to remove freckles (this journal, Jan. 6, 1898, page 13.) Both iodine and carbolic acid are very active and caustic when applied to the skin. This formula was taken from a German pharmaceutical journal and the quantity to be applied was not given. We should think, however, the circumscribed spots or "freckles" should be merely touched with the solution. A satisfactory dressing for burns made by carbolic acid or other caustics is "cold cream," of the *Pharmacoepœia*. Ointment of zinc oxide may be similarly employed.

Registration in California.

(Salol.) In California two grades of licentiates are recognized, registered pharmacists and assistant pharmacists. The former are required to have had four years' experience before registration. The latter must have had two years' experience and be eighteen years of age. Graduates of legally constituted colleges of pharmacy are registered without examination. The fee for registration is \$5 for pharmacists, and \$2 for assistants. An annual renewal fee of \$2 is required from pharmacists, and of \$1 from assistants. Persons registered as pharmacists are exempt from jury duty. The present secretary of the board is John Calvert, Clay and Kearny streets, San Francisco.

Olive Ointment.

(C. R. J. K.) The following is from an old formula:
 Olive oil 1 pint
 White wax 4 ounces
 Spermaceti 4 ounces

Melt together and stir constantly until cold. This ointment was frequently used as the basis for strong medications to be applied by inunction.

The compound lead ointment of the old London Pharmacopœia contained a large proportion of olive oil and was as follows:

Lead plaster 3 pounds
 Olive oil 18 fl. ounces
 Melt together and add
 Prepared chalk 6 ounces
 Acetic acid 6 fl. ounces
 and stir until cold.

None of the present day formularies employ the title above given, though various combinations are dispensed when such a preparation is called for.

Asthma Powder.

(A. S. K.)

(1) Powdered lobelia leaves,
 Powdered stramonium leaves,
 Potassium nitrate,
 Powdered black tea, of each, equal parts.

The fumes from the burning mixture are to be inhaled.

(2) Potassium nitrate 2 parts
 Powdered anise seed 2 parts
 Powdered stramonium leaves 4 parts

A dram of the mixture is placed in a conical heap on a plate and lighted at the top and the fumes inhaled.

(3) Stramonium 2 ounces
 Cannabîs indica 1 ounce
 Lobelia 1 ounce
 Eucalyptus 1 ounce
 Tea 1 ounce
 Aniseed 60 grains
 Potassium nitrate 1½ ounces

Reduce all to powder and pass through a No. 30 sieve; then dry thoroughly. If the potassium nitrate be mixed with 3 ounces of water, and the vegetable powder be moistened with the solution, and then thoroughly dried, it burns better; but if all the ingredients are well dried, and the niter is thoroughly mixed, this is not necessary.

(4) Culeb ½ ounce
 Digitalis 1 ounce
 Jaborandi 1 ounce
 Stramonium 2 ounces
 Potassium nitrate 1½ ounces
 Grindelia 1 ounce
 Eucalyptus ½ ounce
 Cascarella 60 grains

Mix when perfectly dry, and burn from 1 to 2 drams, inhaling the fumes.

Detection of Adulteration in Vanilla Beans.

(L. P. K.) Vanilla is subject to frequent falsification. It is sometimes found that part of the odoriferous principle has been abstracted by alcohol and an inferior odor substituted by rubbing the pods with Balsam of Peru (Sawer). This authority also states that the pods are often filled with sand and other matters to give them weight, and it is not an uncommon fraud to dust them over with benzoic acid, to imitate the fine qualities which are naturally frosted with the crystals of vanillin which form on them. Sophistication is quite readily detected, however, by the experienced manufacturer. The percentages of vanillin in the best qualities of Mexican, Bourbon and Java varieties of vanilla are given by Tiemann and Haarman as 1.69, 2.48 and 2.75 respectively. These may be quantitatively estimated by the method advised by the authorities above named. This method is based upon the fact that vanillin, in common with other aldehydes, combines with acid sulphites of the alkalies to form compounds which are readily decomposable by acids; vanillin being the only aldehyde present in vanilla, it is isolated without difficulty. (Pharm. Jour. 3, VI, page 603). It must be stated, however, that many

authorities are of the opinion that the amount of vanillin present in vanilla is not a true indication of quality. Benzoic acid may be recognized by abstracting it with sodium carbonate, adding sulphuric acid and metallic magnesium or zinc; the benzoic acid is reduced to benzaldehyde, which is recognized by the characteristic odor of oil of bitter almond (Schimmel). Solution of ferric chloride added to the sulphuric acid solution will give a reddish brown precipitate of ferric benzoate. Physical appearance is perhaps a most important factor in determining the quality of vanilla beans, and it is a good rule to buy the freshest product of the variety wanted from a reputable house. The product known in the market as "cut beans," is said to be most liable to adulteration, the more expensive varieties like the Mexican being mixed with cheaper varieties.

Bitterless Cascara Sagrada.

(J. G. D.) It is said that the dark color of the so-called "bitterless extracts" of cascara is due to the liberation of certain extractives by the magnesium compound formed during the process of manufacture. To make the preparation more palatable after removing the bitter resin it is sometimes combined with licorice, aromatics, etc. Here are three formulas for preparations containing one or more of these adjuncts:

(1) Cascara sagrada 1 pound
 Calcined magnesîa 1½ ounces
 Glycerin 2 ounces
 Solution licorice, N. F. 2 ounces
 Saccharin 30 grains
 Oil fennel 10 drops
 Alcohol 12 fl. ounces
 Dilute alcohol, enough.
 Water, enough.

Mix the cascara and magnesîa, moisten with water and set aside for 48 hours. Then pack in a percolator, pour on the alcohol and let stand, well covered, for 12 hours. Percolate with dilute alcohol, reserving the first 12 fluid ounces passing, until exhausted. Recover the alcohol from the second portion of the percolate; evaporate to the consistence of a soft extract; dissolve the extract in the reserved percolate; finally, add the remaining ingredients.

The formula, as modified by Stevens, is as follows:

(2) Cascara sagrada 500 grams
 Calcined magnesîa 50 grams
 Water 550 Cc.
 Glycerin 120 Cc.
 Alcohol 400 Cc.
 Purified extract licorice, N. F. 120 grams
 Saccharin 2 grams
 Oil fennel 0.31 gram
 Dilute alcohol, enough.

Mix the cascara and magnesîa, moisten with water and macerate for several hours. Pack the mixture in a percolator and allow to macerate 48 hours, then add the alcohol and allow to macerate for 12 hours. Now percolate with dilute alcohol and continue until the drug is exhausted. Reserve the first 400 Cc., and recover the alcohol, commencing with the most dilute of the liquors. Evaporate the whole until it measures 380 Cc., including the glycerin; add the licorice, saccharin and oil of fennel, the whole to measure 500 cubic centimeters.

Freshly slaked lime may be used instead of calcined magnesîa for the removal of the bitter principle. Urban's formula (Phar. Rev.) is as follows:

Cascara sagrada 1,000 grams
 Licorice root 150 grams
 Freshly slaked lime 100 grams

The lime is thoroughly mixed with the ground drugs, and the mixture kneaded with 1,000 Cc. of water. This is allowed to macerate for ten or twelve hours, and then dried at a temperature of between 40° C. and 50° C. It is then moistened with 400 Cc. of a menstruum compound of

500 Cc. alcohol.
 250 Cc. glycerin.
 250 Cc. water.

It is then firmly packed in a percolator and the balance

of the menstruum poured upon it, followed by water sufficient to exhaust the drug. The first 550 Cc. of the percolate are reserved; the weaker percolate is evaporated to a syrupy consistence, and added to the first percolate. The aromatics, say, 12 Cc. of compound spirit of orange, are added, and lastly sufficient dilute alcohol to make 1,000 Cc.

The resulting preparation is very palatable, and possesses the cathartic properties of cascara in a marked degree.

Syrups of Phosphates and Hypophosphites.

(D. & Z.) Both of the formulas you submit are modifications of those given by the National Formulary for Compound Syrup of Phosphates and Compound Hypophosphites. In place of the first we suggest you use the first N. F. preparation above named. In the other formula we think you have made some mistake, in that you employ half as much sulphate of strychnine as you do quinine. Try the following formula for Compound Syrup of Hypophosphites, which contains all of the substances you name and is recommended to yield a syrup of cloudy appearance:

Calcium hypophosphite	352	grains
Sodium hypophosphite	176	grains
Potassium hypophosphite	176	grains
Manganese hypophosphite	22	grains
Iron hypophosphite	22	grains
Potassium citrate	50	grains
Quinine hydrochlorate	12	grains
Citric acid	25	grains
Strychnine sulphate	3½	grains
Sugar	3½	pounds
Iron pyrophosphate	40	grains
Water, to make	4	pints

Into a wide-mouthed, half-gallon bottle introduce the calcium, sodium, and potassium hypophosphites, and the quinine salt, sugar, and some water. Dissolve, with the aid of heat, the iron and manganese hypophosphites, the potassium citrate, and the citric acid, in about 2 fluid ounces of water, and pour into the bottle, together with the solution of the strychnine sulphate (best made in a test tube). Now add enough water to make one-half gallon; tie over the bottle well with parchment paper, and shake frequently, to dissolve the salts and sugar; then strain if necessary. This still perfectly clear syrup is now superstratified (preferably in the same wide-mouthed bottle) with the concentrated aqueous solution of the iron pyrophosphate, and set aside for 12 hours.

A simpler formula, said also to yield excellent results, is as follows:

Calcium hypophosphite	180	grains
Sodium hypophosphite	90	grains
Potassium hypophosphite	30	grains
Iron phosphate (U. S. P.)	15	grains
Manganese hypophosphite	15	grains
Quinine sulphate	5	grains
Strychnine sulphate	1	grain
Water	3 fl. ounces	

Heat together all the ingredients until dissolved, and add to

Boiling syrup

Boil for about half a minute with constant stirring, and then set aside and finally strain.

The Practice of Pharmacy in the North West Territories.

(E. T. M. and Others.) The enforcement of the laws regulating the practice of pharmacy in the Northwest Territories is under the general supervision of the Pharmaceutical Association. The legislative ordinance creating the association and outlining its duties, was effected by the Lieutenant Governor, by and with the consent and advice of the Legislative Assembly, Jan. 25, 1892. To become a registered pharmacist, applicants are required to produce evidence that they have served at least four years in a drug store, and must pass an examination which embraces chemistry, pharmacy, botany, materia medica, and translating prescriptions and practical dis-

persing. Examination in these six subjects is obligatory. The maximum number of marks in each subject is 100, of which candidates must secure 50 per cent. of the aggregate, and 33½ per cent. in every subject, before a certificate of registration can be granted. The regular examination of the association is generally held on the first Wednesday and Thursday in February and August in each year, or such days near thereto as may be determined by the council of the association. Upon satisfactorily passing this examination the applicant is entitled to be registered as a pharmaceutical chemist. The only persons allowed to become registered without examination are those possessing a diploma or certificate of admission to practice as a pharmaceutical chemist in any part of Her Majesty's dominions by any pharmaceutical association or college of pharmacy empowered by law to grant such diplomas or certificates. Persons producing satisfactory evidence that they have been engaged in actual practice as chemists and druggists, or dispensing chemists or apothecaries, either as clerks or managers for at least four years prior to the passing of the pharmacy act, and who at the time of the passing of the act were residents of the territories, are also allowed to register without examination. The fee paid by candidates for examination is \$15. fee for first registration \$10. Candidates who fail to pass an examination may be re-examined upon payment of half the regular fee. It is declared unlawful for any person to keep open shop for retailing, dispensing or compounding poisons by other than legally registered pharmaceutical chemists. It is also unlawful for any person other than a legally registered pharmacist to assume the title of "chemist and druggist," or "pharmaceutical chemist," or "druggist," or "pharmacist," or "apothecary," or "dispensing chemist." Physicians and surgeons may be registered as pharmaceutical chemists without undergoing examination, and the pharmacy act does not prevent any person whatever from selling goods of any kind to any person legally authorized to carry on the business of apothecary, chemist or druggist, doctor of medicine, physician or surgeon, or to veterinary surgeons.

We are indebted to A. D. Ferguson, Wolseley, N. W. T., Registrar and Treasurer of the Pharmaceutical Association, for the above particulars.

THE FIRE FIEND AS A DYER.—Elberfeld, Germany, was recently the scene of a fire which will probably result in a crop of lawsuits against the Elberfeld Aniline Color Works for damages caused to goods, furniture, clothing, etc., by flying particles of color borne far and wide by the wind during the progress of the blaze, says Fire and Water. (Sci. Amer.) Within a radius of ten kilometers from the place of the fire serious damage was done to wash on the line, household furniture, newly painted houses and open stock of merchandise by those flying particles of aniline of all colors and shades which were deposited on the injured articles from the burning factory. In the Roman Catholic Church of St. Lanvutus, at Elberfeld, the vestments have been stained to such an extent that they more nearly resemble the dresses worn by a harlequin in a pantomime. Fire underwriters, to whom innumerable claims for damages have been presented, deny liability, and the opinion prevails in legal circles that the color works can be made responsible, if it can be shown that the fire occurred through some negligence on the part of the company or its employes. Other lawyers claim that the value of any insured furniture, clothing, or other goods injured in the way above mentioned can be recovered from the insurance companies direct, as the loss was as clearly traceable to fire as any from water or smoke only in cases where the goods are not hurt by the fire—leaving it to the insurance offices to recover from the Aniline Color Works.

THE PHARMACEUTICAL ERA

[WEEKLY]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, FEBRUARY 3, 1898.

No. 5.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York.
By D. O. HAYNES & Co.

Subscription Rates: U. S., Canada and Mexico \$3.00 per annum.
Foreign Countries in Postal Union. 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483, NEW YORK.
Cable Address: "ERA"—New York.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL..... 161	Cutter Fails..... 179
CORRESPONDENCE..... 163	German Apothecaries' Ball..... 180
Conflict of Diseases..... 164	Bowling..... 180
Compound Interest..... 164	Scott & Bowne Start Suit..... 181
EKA VOCHS IN PHARMACY..... 165	News Letters..... 181
Inorganic Chemistry..... 165	BUSINESS RECORD..... 188
Botany..... 168	Associations, Boards and
New to Make the Soda..... 170	colleges..... 189
Fountain Pay..... 172	Torrey Botanical Club..... 189
PHARMACY..... 172	BOOK REVIEWS..... 191
QUESTION BOX..... 174	OBITUARY..... 192
NEW DEPARTMENT..... 177	PATENTS, TRADEMARKS,
Philadelphia Drug Ex-..... 177	ETC..... 192
change..... 177	TRADE DEPARTMENT..... 193
Shorter Hours..... 177	State of Trade..... 193
New Health Board Bill..... 178	New York Markets..... 194
Boston Druggists' Associa-..... 178	PRICES CURRENT..... 195
tion..... 178	TRADE NOTES..... 198

"The British and Colonial" Druggist, London.

Subscriptions and advertisements for this weekly drug journal will be received and forwarded through this office. Specimen copies and schedule of rates will be furnished upon application.

SPRING ADVERTISING.

As it takes some time to prepare the ground and plant the seed for anticipated crops, the lively kind of advertising druggist is already looking forward to the preparation of the advertising which is to bring him a goodly share of what is known as spring trade. His field should be prepared now so that later on it will blossom with printed ideas about spring medicines, wall paper, paints and other seasonable goods, etc. The thinking and planning and cutting and trying should be done now, and there is no better aid for doing these things than a copy of "Sample Advertisements for Druggists."

It contains 180 sample advertisements, all of them written and illustrated to sell drug store goods, and quite a number of them are intended for goods which the druggist sells in the spring. The book costs 50 cents per copy, postpaid, and it is an investment which will pay dividends every time there is some advertising to be planned and written.

The Extension of Trade.

The meeting of the National Association of Manufacturers held in this city during the past week brought together a class of our citizens whose positions in their respective spheres of activity represent triumphs and achievements of which any country may be proud. Simmered down to its basic principles the purpose of this gathering may be expressed in the words of the above caption, the "Extension of Trade." And the subject is worthy of the consideration of every pharmacist whose energies have not been numbed or totally paralyzed by the fallacious belief that he is not a business man but a professional man. There are too many present day pharmacists sighing for the return of what they are pleased to call the Golden Age of American Pharmacy, when trade knew not the methods of the cutter, nor had yet the specialty manufacturer been abroad in the land. There are other pharmacists who have not yet clearly awakened to the fact that they must "hustle," and hustle for all there is in the business. The so-called "Golden Age" may be rich in memories of past achievements and associations, but present day conditions now obtain, and out of them must be evolved success or failure. Legislation may assist in a forward movement, but it is mainly to himself the pharmacist must look for success; he must win his trade.

Local conditions and environment are factors of great importance in the extension of trade. The same energy exerted by Smith in his little New England town may not bring the results experienced by Jones in his far Western village. One's efforts must be intelligently directed. Competition was close, but Jones, by his intelligent grasp of the situation, developed an individuality all his own. He was, in Western phrase, a "hustler from way back." The means to success were thoroughly studied by him, and as a result he was a winner. It matters not the particular line along which he developed. It may have been manufacturing, handling profitable side lines, introduction of new methods into his business, local advertising, etc. It is safe to assume he studied all of these subjects. Successful pharmacists must study them and success may be the reward of the average pharmacist if he so wills. The earlier the drug business is placed on a basis of practical results and sound common sense, the earlier will it experience a revival and extension of trade.

Great and Beneficent is Science.

Science in its practical application is a fascinating subject; especially so is medical science. Microscopists and bacteriologists have contributed greatly to the world's welfare by their investigations into the causes of disease and by the formulation of logical methods of treatment. An ounce of prevention is worth a pound of cure, and preventive measures are receiving their proportionate share of attention. As we are flesh eaters, these scientists are endeavoring to secure for us a safe, undiseased flesh food supply. A recent instance of their good work has just been brought to notice by the Chief of the U. S. Bureau of Animal Industry, Dr. D. E. Salmon, who has submitted to Secretary of Agriculture Wilson a report upon the experiments made in the treat-

ment of hogs for hog cholera with antitoxine serum. This serum is made upon the same principle as the antitoxine of diphtheria. Good serum has been obtained from both horses and cattle. The cost is but ten cents per cow. The serum was last fall tested on several herds of swine. Only 39 died out of 244 animals treated, of which 86 were sick. Consequently 82.8 per cent. of the animals in these herds were saved. Of untreated herds kept under observation, about 85 per cent. of the animals died. Secretary Wilson will ask Congress for an appropriation to distribute serum next year free.

Cleanliness is Getting Next to Godliness.

But a few years ago the man who made patent medicines and advertised them received the palm and wore the laurel wreath as reward of merit for ingenuity and fertility of resource in advertising. He was an adept in the telling or printing of wonderful stories. His genuins for publicity reached a climax when he was able to print the testimonials of the clergy and prominent members of society whose opinions upon pills and biters unquestionably had an influence upon the minds of the masses.

It must have occurred to those restless persons who are burdened with the responsibility of originating the new in advertising that a Klondike strike could be made if the masses, instead of their leaders, could be rounded up in convenient units. The thing has been done. It has been done with soap, not with patent medicines. An enterprising firm of Chicago soap-makers has offered to pay to the W. C. T. U. one cent for every wrapper of a cake of a particular brand of soap which the society shall collect and present to the firm. From newspaper reports we gather that this offer has been accepted with both precipitation and determination. Any one who has observed and admired, even unwillingly, the persistence and unwavering courage which has characterized the warfare waged by this society against intoxicating liquors will admit, without the trouble of thinking it over, that the estimable members of the W. C. T. U. can sell soap if they once set their hearts upon it. Indeed this point is already beyond conjecture—they are using and selling thousands and thousands of cakes of —'s soap.

There is another chapter to this story. There is another soap manufacturer of Chicago to whom the adjective enterprising also fittingly applies. While the first-named is aiding the reform of mankind from bibulous ways, the latter has gone one better and adopted a plan which has for its object bringing mankind to biblical ways. He offers a premium for soap wrappers which shall be returned to him by churches and charitable institutions which are desirous of building up their finances. As an advertising proposition these plans challenge admiration. Even those who do not need soap will feel impelled to buy for the good of temperance and morality. Never before was the truth of Wesley's contention that cleanliness is next to godliness made so plain even to the unwashed.

The Cause of Free Alcohol.

The cause of free alcohol for use in the arts and manufactures is not dead, if we are to believe the remarks made by Commissioner Henry Dalley, Jr., at the recent meeting of the National Association of Manufacturers held in this city. Statistics were quoted to show that free alcohol for these purposes is not only desirable as a matter of general policy, affecting our national trade, but it is a positive necessity, if we would materially increase our commerce with foreign nations in goods manufactured with alcohol. The United States law called the Manufacturing Export Bonded Warehouse Law, whereby manufacturers may, by establishing their own bonded warehouses, use alcohol free of tax for the

manufacture of goods for "export only," was shown to be rendered practically nugatory from the fact that the average manufacturer cannot sustain the burden profitably. That other anomalous law by which manufacturers who export alcoholic goods may secure a rebate of the customs duty paid upon the foreign alcohol used in such manufacture, is certainly not encouraging to the production and use of domestic spirits.

A remission of part or the whole of the high tax on alcohol must come. Under proper regulations such a procedure would redound to the extension of American industries and the financial remuneration of the manufacturer, either great or small. Nearly all manufacturers would use free alcohol if they could.

Practical Examination.

The Illinois pharmacy law has long been known to possess many commendable features, and its practical workings have commanded quite generally the respect of the druggists of that State. To still further extend its scope of usefulness the Board of Pharmacy, upon which devolves the execution of the law, now announces that it will hereafter hold regular practical examinations and that all applicants must possess the following general requirements:

Applicants for examination will be expected to have a knowledge of the principles underlying the science of chemistry and the practice of pharmacy.

A sufficient knowledge of mathematics to be able to calculate percentage solutions, and convert one system of weights and measures into another.

To be sufficiently conversant with Latin to correctly read and interpret prescriptions.

To be thoroughly acquainted with manipulations or practical work, in so far as pertains to percolation, fusion, solution, trituration, emulsification, evaporation, and other manipulations daily occurring at the prescription counter.

To be familiar with organic Materia Medica. To be well informed on Posology and Toxicology.

To read correctly fifty prescriptions, selected at random, from various sources in the State.

Fifty or more oral questions will be asked, relating to dispensing, manufacturing, posology, toxicology, materia medica, chemistry, and pharmacy.

The applicant will be required to compound such prescriptions as the examiners may designate, in order to show proper qualifications for dispensing.

Other special qualifications are noted as required by the Illinois law, but the requirements mentioned above are the meat of the whole subject of Boards of Pharmacy examinations. They are intensely practical, and should be incorporated in the requirements exacted of applicants for registration by Boards of Pharmacy generally.

Better Than the Klondike.

A genius from North Dakota has located in Minneapolis for the benefit of the world in general. He has a wonderful dandruff cure, and he uses a stock out of Mark Twain, as a picture of himself, to boom business. He also "examines scalps by microscope (how he does it we are not told) and supplies the world with the great discovery." Nothing particularly new in these pretensions, but a little out of the ordinary is his admission that "it has taken him fifteen years of experimenting to perfect this drug and bring it down to a happy medium where it will kill the germ which destroys the hair and not injure the patient."

We know of a man who many years ago secured a patent for a nest egg to keep lice from setting hens, but the egg killed the hens; so he made the mixture up into clay balls for trap shooting, failure here also; at last the stuff was dissolved and sold and is still selling as a consumption cure. Result, fame and fortune. So, if this

dandruff cure will not work perhaps it can be used in lamps, as we are informed it is an extract of soft coal. "The professor has received his patents on the retort for making it, and it (sic?) is the first one ever issued by the Government and covers the United States and Canada" is additional information supplied. We do not give the professor's name, but he may find this of value as a free advertisement.

Buying Goods and Business.

"What business has the tortoise in the clouds?" asked L'Estrange, and his question with a similar answer may be paralleled by another, what business has that man in the practice of pharmacy who always runs in a rut and sticks to the old ways when competition is making new paths and leaving him far behind? The business man is forced to study trade conditions, supply and demand, and all of the various wiles that are supposed to tempt customers. Successful buying is the most important profit-earning element in business, for style, variety and novelty at reasonable prices are what the average customer demands. If he cannot secure from you goods possessing these attributes, he will go where he can secure them. New and salable merchandise, the things your customers are looking for, are the things for which they will pay a good price.

Can't Get Away Club.

There is a misleading levity in this title, for the druggist who reads it and thinks of the conditions of his life will feel inclined to claim membership. The name is suggestive of the end of the century, but it was coined in 1854 in Mobile, Ala., as a distinctive title for a devoted organization whose purpose was to remain and administer while others fled to escape the dreaded ravages of yellow fever. The club had work to do in 1897, and printed report has been sent to us by its treasurer, M. M. Tucker, a druggist of Mobile. This report shows that the club handled over \$6,000 during the prevalence of the disease, and had under its direction 113 nurses whose aggregate term of duty amounted to 728 days. This is a most excellent record of action for a club whose active membership roll shows but 32 names.

There seems to be quite a discussion over the proposal of a lot of physicians of Paterson, N. J., to establish a drug store in that city which shall dispense drugs in their most transcendent state of purity, and in which substitution shall be an anathema. This procedure may be a trifle unpleasant for the established trade of Paterson, but the outcome with its obvious lesson will be of inestimable value to the pharmaceutical fraternity at large. A drug store run by and for physicians is an object lesson which pharmacy greatly needs and there is a pardonable curiosity about it. The drug trade is willing to learn, and it will take heed of the action of a dozen doctors each specifying a different make of pharmaceuticals when the time arrives for laying in stocks of, for instance, twelve brands of extractum ergotæ fluidum and paying the bills therefor. There are other little business problems connected with the running of a drug store which may be solved by this experiment conducted with the hard-earned money of the medical profession, or among the least of these is a frictionless plan for inducing a partnership between people who are otherwise fierce competitors with all the feelings and jealousies of competition.

An evil-disposed drug clerk in Astoria, Ore., has been rested on the charge that he willfully set fire to his employer's store by starting a blaze among the oils and engine. He does not deny the charge. There are a great number of agents capable of destruction to life and property embraced in the stock of even the most insignificant drug store, which goes to show that all entrusted with their care and handling should be men of sobriety and capability. This clerk was drunk.

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

PERFUME EXTRACTION.

Sherbrooke, Nova Scotia, Jan. 24, 1898.

To the Editor: On page 81 of your issue of Jan. 20th, I notice that you have a paragraph entitled "A New Method of Perfume Extraction." While I do not dispute the efficiency of the method, I decidedly question its novelty. In my library I have a book, published by Bell & Daldy, York street, Covent Garden, London, England, in the year 1872, entitled "My Garden," by Alfred Smee, F. R. S. On page 227 of the second edition he gives an account of the process you describe in your last number, illustrating it with a drawing of the apparatus (Fig. 441). At the conclusion of the paragraph he says: "The scent thus obtained is very perfect and interesting, but is apt to become sour in a few days, unless some pure alcohol is added." I may add that two years ago I collected a small quantity of perfume from hyacinths and nasturtiums, using such a process as Mr. Smee describes, with a mixture of ice and ammonium chloride in place of salt and ice.

If you have space you might publish this in justice to Mr. Smee, who has written and illustrated one of the most beautiful works on gardening in the English language.

EDMUND JENNER.

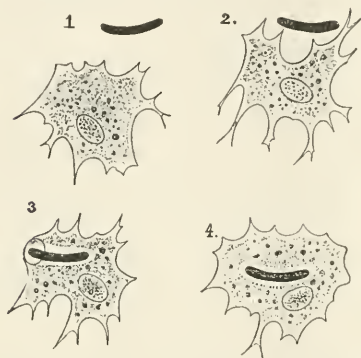
CURRENT WINE is prepared according to "Ph. Ztg." as follows: To make 30 liters of wine, take 10 liters of fresh currant juice, 10 kg. of sugar and sufficient water to fill the cask to the bung-hole. To keep out flies, etc., the bung-hole is covered with a piece of gauze. When fermentation begins, the scum ejected through the hole is washed off daily, as also the gauze. Any fluid running over is caught in a dish and returned to the barrel and this filled again to the top with sugar water. When the violent action is over, the bung may be put in loosely and the cask put into the cellar and it then suffices to open it once a week. At the end of March or beginning of April the wine is filled into bottles. (Ph. Rundschau.)

VALUATION OF IODOFORM GAUZE.—The following simple method is recommended by Giulio Morpugo (Giornale de Farmacia), who does not claim it to be absolutely reliable, however. He uses a beaker, that can be closely covered with a porcelain dish, weighs off 10 Gm. of iodoform gauze and moistens it in the beaker with a little water, then fastens between beaker and cover a piece of filter paper, which is previously dried over calcium chloride and weighed, and heats the beaker on a waterbath, while the porcelain dish is kept cold with ice. The iodoform is volatilized by the heat and condensed in the filter paper, which is again dried and weighed. The increase in weight represents the iodoform in 10 Gm. of the gauze. (Ap. Ztg.)

The uses of adversity have had sweetness attributed to them, and moralists have always found a theme in the supposition that trial and suffering are necessary to bring out the loftiest traits of human character. There is corroborative evidence of all this in reports from a Kansas town. The druggists of this unlocated place had cut and cut until the lowest depths of adversity were just ahead. At this juncture shone forth one of the sweet uses referred to—one of the combatants advertised that he would divide with the churches of his town five per cent. of the gross amount of all sales.

THE CONFLICT OF DISEASE.

We have long been accustomed to speak of disease as a battle; we say that the sufferer is "making a splendid uphill fight," and that he has "subdued" the disease or that the disease has "vanquished" him. It is only recently, however, that physicians have had grounds for the belief that the patient is rather the battlefield than an active contestant. The real battle is fought out within him between the attacking germs armed with their deadly poisons or "toxins," and the white blood-cells, "leucocytes" or "phagocytes," which strive to overcome them and thus save his life. In an article on "The Blood" in *La Monde Moderne*, Paris, November, Dr. J. Laumonier describes the process graphically. He says:



1, 2. The phagocyte or leucocyte approaches a bacterium and extends its pseudopods toward it to envelop it. 3. The bacterium, surrounded by the pseudopods, penetrates into the protoplasm of the leucocyte, or is encirculated. 4. The bacterium is digested by the phagocyte.

"Besides the red globules there are in the blood white globules or leucocytes. These are colorless cellules without membrane, mobile, and of changing form, whose constituent matter, or protoplasm, is granular and contractile. They are much less numerous than the red globules, and there is only one of them to every 350 or 400 of the red globules; but to make up for this they are found elsewhere than in the blood, notably in the conjunctival tissue, the glands, the lymph, etc. This ubiquity of the leucocytes is due to their mobility, to the plasticity of their protoplasm, which enables them to slip into the smallest intercellular spaces and thus to migrate from tissue to tissue. This journeying about is called 'diapedesis.'

"We may ask, 'What is this diapedesis for?' Like all cellules the leucocytes are very sensitive to the action, even at a distance, of certain reagents, certain chemical substances, which, for this reason, attract or repel them. Among the substances that attract the leucocytes most energetically are the 'toxins' or substances secreted within our organism by pathogenic microbes such as the charbon bacillus or the staphylococcus of pus. When such microbes exist in any part, and their presence is revealed by the presence of toxins carried by the blood, the leucocytes move toward the contaminated point and proceed to devour, by enveloping them in their protoplasm, the bacteria that they meet (see figure). For this reason the leucocytes are called also 'phagocytes' or devouring cells. But all the leucocytes do not succeed in thus devouring their prey; a certain number die, poisoned by the microbian toxins, and their accumulated bodies form pus. When the leucocytes finally succeed in destroying the pathogenic bacteria, the contagious or virulent malarial is staved, the invalid is cured; when, on the contrary, the leucocytes are vanquished by the number of their adver-

saries or the virulence of their secretions, the malady spreads and the patient is in peril of death. This process of 'phagocytosis,' which was discovered only a short time ago, is one of the most curious processes of defense in our organism, and the vaccinations so widely employed in our day have for their object, by the previous attenuation of the inoculated virus, to habituate the phagocytes progressively to the poisons against which they would not be able to struggle were they introduced all at once and with no opportunity for adaptation."—Translated for the *Literary Digest*.

WHAT COMPOUND INTEREST WILL ACCOMPLISH IN TWO HUNDRED AND SEVENTY-ONE YEARS.

A New York paper recently said that the Dutch bought the island of Manhattan, in 1626, for the trifling sum of \$25. It estimated the present value of the city proper at between fourteen and fifteen hundred millions of dollars, and added: It will be thought that the Dutch made a good bargain, and perhaps they did, but if that \$25 had been put at interest at that time at 10 per cent. per annum and the interest compounded every year, it would have amounted to more than twice the present value of New York. The statement seemed incredible at first, and the writer undertook to verify the figures. To his surprise he soon found that the journal had made a mistake, but not in the direction that he at first had supposed. On the contrary, vast as the sum named seems, the actual amount is many, many times greater.

Let us figure it out briefly. In calculating compound interest, the sum is to be multiplied by 1 plus the rate of interest for the number of years the amount has to run, the result being the principal and interest at the expiration of the period. This is equivalent to raising 1 plus the rate of interest, or in this case 1.10 to the power represented by the number of years, here 271. To calculate this out by the ordinary process of multiplication, is the work of several hours, but by logarithms it becomes a simple matter of multiplying the logarithm of 1.10 by 272, which gives us the logarithm of the result, which is quickly found by reference to a table of logarithms.

The logarithm of 1.10 is 0.041,3927 (in a table to the seventh decimal), and this multiplied by 271 = 11.217,4217, in which 11 is the characteristic of the logarithm, and shows that the result contains 1 more than that number of integrals, or that the sum amounts into the hundreds of thousands of millions. The number answering to the logarithm is 174,976,349,809.88, which is \$1 at compound 10 per cent. interest for 271 years. Multiply this by \$25, and we have the enormous and inconceivable sum of \$4,374,408,770,244.50, or upward of four million three hundred and seventy-four thousands of millions of dollars. In silver, at 412 grains to the dollar, this sum would weigh over 136,000,000 tons. Each dollar being 1.4 inch in diameter (about), placed side by side, it would make a line of dollars 97,000,000 miles long, or reaching from the earth to the sun, with something to spare. It would make a great bridge of silver, 48 feet wide from the earth to the moon. If it were in gold dollars a half inch in diameter, it would make a line 34,000,000 miles long, which would make a belt of gold dollars seven feet wide from the earth to the moon. Counting at the rate of 60 dollars a minute, day and night, it would take 1,000 men 140 years to count the sum. These figures are absolutely appalling, bewildering in their immensity. The human mind can grasp them only by such comparison: as we have made.—(Nat. Dr.)

FURFURON, or "etheral extract of hayseed," is called a liniment of dirty green color and strongly alkaline reaction, which is recommended for gout and rheumatism. According to "Th. Ztg." it consists principally of a soap, mixed with camphor, salicylic acid, acetic ether, ammonia, and an alcoholic extract of peppermint.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.

Virgil Coblenz, A.M., Ph.M., Ph.D., F.C.S.

Albert E. Ebert, Ph.M., Ph.D.

James M. Good, Ph.G., M.D.

Arthur L. Green, M.D., Ph.D., Ph.C.

Charles F. Heebner, Ph.M., Ph.G.

George B. Kaufman, B.Sc., Ph.D.

E. J. Kennedy, Ph.C.

Henry Kraemer, Ph.G., Ph.D.

Edward Kremers, Ph.G., Ph.D.

John Uri Lloyd, Ph.M., Ph.D.

Oscar Oldberg, Ph.D.

Charles W. Parsous, Ph.C.

Edgar L. Patch, Ph.G.

George F. Payne, Ph.G., M.D.

T. D. Reed, M.D., C.M.

Edsel A. Ruddiman, Ph.M., M.D.

Henry H. Rusby, M.D.

Otto Sabli, A.M.

L. E. Sayre, B.S., Ph.M.

Wilbur L. Scoville, Ph.G.

William Simon, Ph.D., M.D.

F. E. Stewart, M.D., Ph.G.

Julius W. Sturmer, Ph.G.

Otto A. Wall, Ph.G., M.D.

Frederick J. Wullig, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in **THE PHARMACEUTICAL ERA**, and the **QUIZZES** and **EXAMINATIONS** are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and **DIPLOMAS** are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the **ERA**, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 41.

Inorganic Chemistry.

Combustion.—(Concluded.)

PROF. WM. SIMON, PH. D., M. D.

Flames.—A flame may be defined as a gas undergoing combustion. Consequently, when a substance burns that is not in itself a gas, and which generates no gas during combustion, there is no flame. We find instances of this kind in the burning of well carbonized charcoal, or iron; in either case is a flame visible, but we have simply a glowing solid, or possibly liquid, mass.

When sulfur or phosphorus burns, the heat generated is sufficient to vaporize these substances and a flame appears, because what does burn are these bodies rendered gaseous by heat.

In other cases, and, in fact, in most cases of the combustion of organic matters, such as wood, paper, wax, etc., flames are produced, though these substances themselves are not volatile. They generate, however, gaseous products during the process of heating. This can be well shown by the following experiment: Fill a test-tube about half full with paper, sawdust, starch, or some other non-volatile organic matter and apply heat. It will then be seen that gases escape from the test-tube, and they can be ignited.

This process of heating non-volatile organic matters in vessels so constructed that atmospheric air has no access, is known as destructive distillation, and is used in many branches of industry, but chiefly in the manufacture of illuminating gas. The gases formed during this process are chiefly hydrogen; methane, CH_4 ; ethylene, C_2H_4 ; carbon monoxide, CO ; and a number of other products which need not be considered here. It is chiefly a mixture of the four gases mentioned which produces the flame when organic matters burn.

Whenever a piece of paper, or a candle, is ignited, the first effect of the heat applied is a decomposition of some particles, with the result that combustible gases are generated which, on further heating, ignite. The heat produced by the combustion acts decomposingly on the adjoining parts of the burning substance, and thus the process continues until the mass has been consumed.

An ordinary flame (Fig. 46) consists of three parts or cones, which appear more or less well defined. The inner

or central portion is chiefly unburned gas; the second is formed of partially burned and burning gas; the outer cone, showing the highest temperature, but scarcely any light, is that part of the flame in which complete combustion takes place.

The nature of the gas mixtures in the different parts of a flame can be readily shown by a number of highly instructive experiments.

If a glass tube be bent, as shown in Fig. 47, and held in the inner cone of a candle flame, some of the unburned gas will escape through the tube and can be ignited at the upper end. By substituting for the candle flame that of a Bunsen burner with the air holes closed, the experiment can be performed most readily.

If a piece of wire gauze be held horizontally in the midst of the candle flame, or deep enough to depress the inner cone, some unburned gas will escape through the gauze and may be ignited above. The reason why the flame, as such, does not pass through the gauze is that the metallic wire, being a good conductor of heat, conducts it away so quickly that the gas above the gauze is depressed below its kindling temperature.

That the temperature in the inner cone of a flame is comparatively low may be shown by quickly inserting a common match into the central portion of it. Notwithstanding the low kindling temperature of the match it may be held for several seconds in the flame, and even taken out again, without ignition. Held in the outer cone the match will ignite almost instantaneously. If the candle used for the experiment does not furnish an extra large flame, it requires some skill to perform it successfully. The student, however, may do it readily, by using an ordinary Bunsen gas burner, the air-holes of which are closed when the experiment is made.

Even gunpowder may be kept in the inner cone for



Fig. 46.

several seconds without ignition occurring. The experiment is made thus: Place a few grains of gunpowder, close together, on a wire gauze; hold this about one inch above a Bunsen burner, the air holes of which are closed; turn on the gas supply fully, ignite the gas by approaching it from above with a burning taper; keep it burning for a few seconds; turn it out before the entire gauze has time to become hot by conduction, and show that the powder is left unburnt.

The second cone is the one to which light is due, and this luminosity is caused by particles of solid carbon

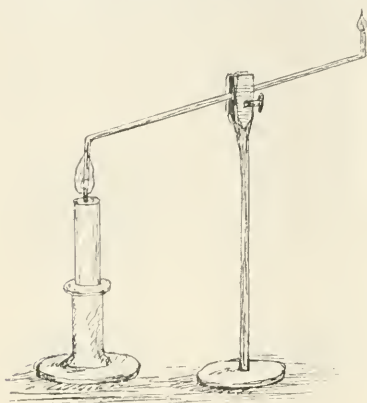


Fig. 47.

heated to a white heat. The presence of this carbon may be shown by holding in the flame a cold plate, for instance, a porcelain dish; this becomes covered by a black deposit of carbon.

The reason for the temporary separation of elementary carbon is that the hydrocarbons present are decomposed, the more combustible hydrogen taking up the limited quantity of oxygen which penetrates into this part of the flame, while carbon is set free. The liberated carbon, on reaching the outer cone, finds there sufficient oxygen with which to combine.

That the outer cone is the hottest part of the flame, and also that free carbon is present in the middle cone, may be shown by holding a thin platinum wire horizontally in the flame. It will be noticed that the wire becomes red hot where it passes through the outer cone, and that carbon is deposited where it was in contact with the middle cone.

Luminosity of Flames.—Each individual substance must attain a specific temperature before it emits light, or becomes luminous. As a general rule this temperature is so high for gases that they burn before attaining the glowing temperature, as we see in the case of flames of hydrogen. (A hydrogen flame burning at the end of a glass tube is generally somewhat luminous or yellow, which is due to the sodium in the glass. This luminosity will disappear when a piece of thin platinum foil is wound around the tube so that the burning gas issues from the platinum jet.)

Also, burning sulfur or carbon monoxid emits no light, because in both cases we have flames burning below the glowing temperature.

While the temperatures at which light is emitted from solids differ widely, yet this temperature is generally very much lower than that required by gases. It is for this reason that flames become luminous when solid bodies are present in the flame. Such a body may be a constituent of the burning substance, as is the carbon in our common flames; or it may be the product of combustion,

as, for instance, the phosphoric oxide generated during the burning of phosphorus. Finally, it may be a solid introduced intentionally into a non-luminous flame, with the view of rendering it luminous. Such a case we have in the calcium light where a piece of lime is heated to intense white heat by an oxyhydrogen flame. Another application of this principle is found in the Welsbach burner, where a cone or mantle made of the oxides of the rarer earth metals (chiefly oxid of thorium) is heated by a non-luminous gas flame.

An excellent illustration of the conversion of a luminous into a non-luminous flame is afforded in the Bunsen burner. This burner, now extensively used for heating purposes, is so constructed that atmospheric air is mixed with the illuminating gas before it is burned. The oxygen, thus introduced as an admixture to the gas, prevents the temporary separation of carbon, and consequently prevents luminosity.

A hydrogen flame may be rendered strongly luminous by passing the gas through a tube, filled with cotton wool that has been slightly moistened with benzol. As this is a volatile hydrocarbon, the hydrogen carries with it some of the benzol vapors, a part of the carbon of which is temporarily separated in the flame heated to incandescence and renders it luminous. If, however, such a gas mixture be burned in a Bunsen burner, no carbon is set free and luminosity does not result.

It may here be stated that increased pressure will augment the luminosity of flames. If this pressure be high enough, flames otherwise non-luminous may be rendered intensely luminous.

Color of Flames.—Most of our ordinary luminous flames show color, varying from a bright white to a yellow or orange. But distinct colors of many shades may be given to flames by introducing substances which have the power of imparting colors to them. Thus, by introducing into non-luminous flames compounds of potassium, a violet color is given; lithium or strontium imparts a beautiful red or crimson, barium or boric acid a green color, etc.

Different methods may be used for coloring flames. For experimental purposes it is sufficient to hold particles of the color-imparting substance in a Bunsen flame by means of a platinum wire bent into a small loop at one end. Or the coloring substance may be mixed with a little alcohol, and this ignited in a porcelain dish. Finally, we may add the powdered flame-coloring substances to a mixture made of combustible material (sulfur, carbon, shellac, etc.), and an oxidizing agent (nitrates, chlorates, etc.) It is by this latter method that our "colored lights" are made.

Explosion.—The sudden and energetic generation and expansion of gases is called explosion. In the bursting of a steam boiler it is the sudden conversion of highly heated water into steam, in consequence of the instantaneously released pressure, which produces the explosive effect.

Chemical changes may produce explosions whenever they lead to sudden generation of gases. Thus we have in nitrogen trichlorid, NCl_3 , a powerful explosive, because it readily and instantaneously splits up into the two component parts, nitrogen and chlorine, both of which are gases. Many similar instances might be mentioned, but of interest here are only those explosions which are due to combustion.

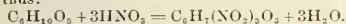
Any combustible gas may be made to burn or to explode; it requires simply a change of conditions to produce either of the results. The gas will burn when it is ignited in such a manner that its molecules may successively combine with oxygen. But if the gas be mixed with oxygen (or atmospheric air) before ignition, combustion will take place rapidly, under favorable conditions almost instantaneously through the whole mass of the gas mixture, and an explosion results. The sudden expansion of gases during an explosion is generally due to the heating effect produced by chemical action. Thus, on ig-

nitrogen a mixture of two volumes of hydrogen and one volume of oxygen, we have a powerful explosion, notwithstanding that the product of combustion, i. e., the steam generated, occupies but two-thirds of the volume of the gas mixture used, provided we were to measure its volume at the original temperature of the gases used for the explosion. But as a very high temperature is produced during the chemical action, the generated steam expands many times in volume, throwing back the surrounding atmospheric air in every direction. But during this sudden expansion of the steam, it is rapidly cooled off, even to a temperature at which it liquefies, occupying a volume many hundred times smaller than before, and the result is that the surrounding atmospheric air rushes back from all sides towards the center of the explosion. The report which accompanies violent explosions is due to this collapsing atmospheric air, i. e., to sound waves generated by the simultaneous striking against one another of millions of air particles. It need scarcely be mentioned that explosions are more violent when pure oxygen is substituted for atmospheric air, because the nitrogen present in air acts as a diluting agent. Equally self-evident is it that those explosions will be most violent in which the constituents are mixed in exactly those proportions in which they combine. However, explosions may take place when there is present an excess of either the combustible substance or of the supporter of combustion. Gas mixtures alone are not essential for explosions. They may occur under other conditions. Thus, we can take a combustible solid substance, provided it is very finely powdered, mix it by means of a blower, or by violent agitation with atmospheric air contained in a box, and upon ignition of this mixture an explosion will follow.

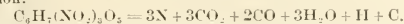
These dust-explosions, as they are called, have taken place both in flour mills and in coal mines. Most explosions in mines, however, are due to the explosion of that gas mixture called fire-damp, the principal constituent of which is methane, CH_4 .

Finally, we have explosions produced by substances in which both the combustible matter and the supporter of combustion are present in a solid form. Such cases we have in gunpowder, gun cotton and in similar substances.

Gunpowder is a mixture of combustible matters, chiefly carbon and sulfur, with oxidizing agents such as potassium nitrate or chlorate. Whenever gunpowder is ignited, combustion takes place rapidly through the whole mass, because the combustible elements are in close proximity to the oxidizing agents. While the decomposition products of different gunpowders vary widely, the following equation may give some idea, in regard to the chemical changes taking place: $4\text{KNO}_3 + 4\text{C} + \text{S} = \text{K}_2\text{CO}_3 + \text{K}_2\text{SO}_4 + 4\text{N} + 2\text{CO}_2 + \text{CO}$. In the best mixed gunpowder we have clusters of molecules of combustible matter lying alongside of similar clusters of oxidizing materials. A much closer contact between combustible elements and oxygen is brought about in the so-called nitro-compounds. These are generally obtained by treating certain organic matters with strong nitric acid, when the group NO_2 replaces hydrogen. Thus cotton, which is nearly pure cellulose, $\text{C}_6\text{H}_{10}\text{O}_5$, when treated with nitric acid, exchanges as many as three atoms of hydrogen for NO_2 , thus:



When gun-cotton is ignited, nearly the whole of it is resolved into gaseous constituents, as shown by this equation:



As there is not oxygen enough present to cause complete oxidation of all carbon and hydrogen, portions of these elements escape unburned. In order to avoid this, gun-cotton, or similar preparations, are mixed with nitrates or chlorates in sufficient quantity to insure the complete combustion of all elements. Smokeless gunpowder is thus manufactured.

Extinguishing Fire.—As stated before, combustion, after once started, will continue until either the combustible material has been consumed, or the supply of atmospheric oxygen has been cut off, or the heat has been depressed below the kindling temperature, or until an agent is made to act which has a special extinguishing power on flame.

Depressing the temperature is the ordinary method for extinguishing fires, and finds extensive use in the application of water, which acts chiefly through its cooling effect, but also by the replacement of air by steam.

Blowing out a flame means the rapid removal of the burning gas, and with it the cause for further heating of gas particles to the kindling temperature.

The supply of atmospheric oxygen may be stopped by throwing soil or sand on the burning substance, or by covering it with blankets or with other suitable material.

Carbon dioxide is the most important of substances which have a special extinguishing power on all burning organic matters. While substances burn in atmospheric air, which approximately is composed of four-fifths of nitrogen and one-fifth of oxygen, they will not burn in a mixture of three-fifths of nitrogen, one-fifth of carbon dioxide and one-fifth of oxygen. An even yet smaller admixture of carbon dioxide will prevent combustion of organic matters.

This can be shown to advantage by using exhaled air from the lungs for the experiment. A flask holding about one liter is filled with water and set mouth downward in another vessel holding water. By now inserting a glass or rubber tube in the neck of the bottle, this is filled with exhaled air from the lungs, care being taken to empty the lungs well, and to avoid breathing through the nose, whereby air that has not passed through the lungs might be added. Upon now examining this exhaled air, it will be found that a wax candle will not burn in it, while a piece of phosphorus will do so almost as well as in atmospheric air. Exhaled air contains but $3\frac{1}{2}$ to 4 per cent. of carbon dioxide, and yet such air does not support combustion of organic matters.

Use is made of the extinguishing power of carbon dioxide in most of the different kinds of chemical fire engines and fire extinguishers, which are differently constructed kinds of apparatus in which carbon dioxide is generated by the action of an acid on sodium bicarbonate. The generated gas is used also for propelling the water through the hose attached to the generator. The extinguishing power of the liquid is due to a small extent to the cooling effect of the water; to a large extent, however, to the action of the gas, partly absorbed in the water and liberated from it by the heat of the burning material operated upon.

TREATMENT OF PERSPIRING FEET.—Dr. Richter recommends either to paint the feet repeatedly during 8 or 10 days with a 10 per cent. solution of chromic acid, or to put into the shoes, one hour before putting on, one or two tablespoonfuls of a solution of formaldehyde containing 10 Gm. per liter. Another remedy is dusting finely powdered tartaric acid, or better, tannoform, between the toes and into the stockings. (Ph. Post.)

SWEEPING OF THE FEET.—Unna's ichthyol ointment is said (Gaz. Heb. de Med. et Chir.) to be an excellent topical application. Its formula is:

Ichthyol	25 parts
Water	15 parts
Lanoline	25 parts

M.

LECTURE No. 42.

Botany.

BY HENRY KRAEMER, PH. G., PH. D.

REPRODUCTIVE ELEMENTS (Continued).

CALYX AND COROLLA IN PARTICULAR.

Chorisepalous and Gamosepalous.—There are a number of terms used to express the condition of the calyx and corolla. The condition of the calyx when consisting of separate sepals is spoken of as being *chorisepalous* in contradistinction to the condition when the sepals are more or less united into a tube, when the term *gamosepalous* (monosepalous, synsepalous) is employed.

Choripetalous and Gamopetalous.—Likewise for the corolla corresponding terms to those already applied for the calyx are employed. When the parts of the corolla are separate it is spoken of as being *choripetalous* (poly-petalous, dialypetalous, cleutheropetalous). When the parts of the corolla are united more or less into a tube it is spoken of as being *gamopetalous* (monopetalous, sympetalous).

Parted, Lobed and Toothed Calyx or Corolla.—On account of the number of sepals or petals that enter into a gamosepalous calyx or gamopetalous corolla, as well as on account of the different degrees of union, a number of terms are employed which indicate the extent of the union and the number of elements involved. The degree of union is expressed by the terms "toothed," "lobed" and "parted," the first indicating a tooth-like division; the last that of division which extends so far that but little union is apparent. A gamosepalous calyx consisting of 5 parts, may be 5-parted, 5-lobed or 5-toothed.

Entire Calyx or Corolla.—When the union of the parts has gone so far that no little teeth even are discernible and a tube is formed of the entire elements of the calyx or corolla they are said to be entire.

Limb or Border.—Where only a part of the calyx or corolla has been used in the formation of a tube the remaining more or less outspreading portion is termed the limb or border of the calyx or corolla.

Unguis or Claw.—In flowers of the N. O. cruciferae, some of the N. O. Caryophyllaceae, etc., there is a conspicuous stalk to each of the petals; this is called the Unguis or Claw. The upper outspreading portion is called the Lamina or Blade.

FORMS OF CALYX OR COROLLA.

Tubular and Ligulate.—There are a number of terms employed to indicate the form of calyx or corolla. Some of these are characteristic for some of the natural orders. We have already noted a peculiarity in the forms of corolla in the flowers of the N. O. Composite. There were two forms: (1) Tubular (Fig. 82), in which the petals were united into a tube, and (2) in which there was a very short tube and a large strap-shaped limb to which the name Ligulate (Fig. 81) has been applied.

Campanulate.—Corollas like those on the Harebell (*Campanula rotundifolia*) that are more or less bell-shaped are called Campanulate.

Ureolate.—A corolla which would be considered Campanulate but for the contraction of the parts at its opening as in Wintergreen (*Gaultheria procumbens*) and other Ericaceae is called Ureolate.

Infundibuliform (Funnel-form). In the morning-glory we observe a corolla that possesses a long tube which gradually widens into a rather broad limb; such a corolla is said to be funnel-form or Infundibuliform.

Hypocrateriform (Salverform).—A corolla as in species of *Phlox* in which there is an abrupt demarcation of tube and limb is called salverform or Hypocrateriform.

Rotate.—A corolla with a short tube and an outspread-

ing limb as in Potato (*Solanum tuberosum*), etc., is said to be wheel-shaped or Rotate.

Crateriform.—A rotate corolla with the margin more or less upturned is called saucer-shaped or crateriform.

Galeate.—In acouite the upper petal is hood (helmet)-shaped or galeate.

Saccate.—In *Viola tricolor* one of the petals is extended into a long spurred appendage. In *Agintegia* species (Columnbine) all 5 petals are thus appendaged. Such a development is spoken of as saccate, calcarate).

Bilabiate.—In the N. O. Labiatae the petals are united into 2 lip-like developments, whence the name *Bilabiate*. The upper lip consists of two petals, whereas the lower lip has the remaining three petals. The calyx is not infrequently 2-lipped. In this case the upper lip is made up of three sepals and the lower of two.

Ringent Bilabiate.—There are two kinds of bilabiate corollas. The one in which the mouth of the tube is open, as in *Monarda*, *Lavandula*, etc., is called Ringent.

Personate Bilabiate.—The form of bilabiate corolla in which the mouth or throat is closed is called Personate, as in *Toad Flax* (*Linaria*), etc.

Papilionaceous.—A corolla like that of the Pea from its fancied resemblance to a butterfly is called Papilionaceous, and is characteristic of one of the great divisions of the N. O. Leguminosae. This sub-division is called Papilionaceae. The corolla consists of three kinds of petals which have been given special names. The large posterior petal covering the others in the bud is called Vexillum (or Standard). The two opposite the latter partly coalesce and form a more or less keel-shaped division, whence the name Carina (or Keel). The two on the sides between the carina and Vexillum are termed Alae (or Wings).

Irregularity in Orchids.—The flowers of the plants of the N. O. Orchidaceae are peculiar and characteristic. The petal in front of the stamen and stigma differs from the others in shape and also secretes nectar. It is called the Labellum.

DURATION OF CALYX AND COROLLA.

There is a great difference in the length of time that the calyx and corolla remain upon the plant. To express this condition various names have been coined as follows:

Caducous.—When the elements drop from the flower so soon as it opens, as the calyx of Poppy, the term caducous is used.

Ephemeral (Fugacious).—When the parts last for at least a day or so as in *Helianthomum*, etc., the term Ephemeral or Fugacious is employed. In some plants as in Poppy while the calyx is caducous, the corolla is ephemeral.

Deciduous.—In some cases the petals fall away after the pollen has been deposited upon the stigma as in the flowers of Rose, Apple, etc. Such petals are termed deciduous.

Marcrescent.—When the elements remain in a withered condition until the fruit is about mature, as in *Drosera*, etc., the term marcrescent is used.

Persistent.—Instead of withering the calyx remains unaffected until the maturing of the fruit as in Labiatae, Rose, etc. Such a calyx is said to be Persistent.

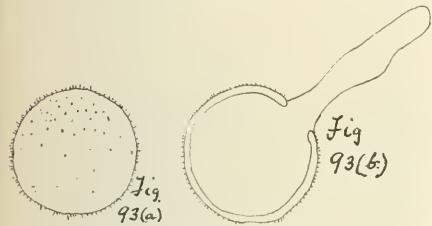
Acrescent.—In the apple the calyx is peculiar in that it grows and becomes fleshy with the development of the ovary to fruit. Such a calyx not only persists but it grows and is termed acrescent.

ANDRŒCIUM IN PARTICULAR.

Number of Stamens.—When the number of stamens in a flower is but one the term monandrous is applied to it. A flower with two stamens is Diandrous; with three, Triandrous; with a great many Polyandrous.

Didynamous.—In plants of the N. O. Labiatae, as *Lavender* (Fig. 92), flowers there are 4 stamens inserted on the corolla. There is this peculiarity, however, in that two are shorter than the other two. Such a flower is said to be Didynamous.

Tetradynamous.—In the N. O. Cruciferae (Fig. 92) to which mustard flower belongs, there are six stamens,



four of which are longer than the other two. Such a flower is described as being Tetradynamous.

Monadelphous, etc.—In some plants, as in the *Lobelia*, *Pea*, *Hypericum*, *Linden*, *Orange* (Fig. 99), etc., the filaments of the different stamens cohere, producing groups or brotherhoods of stamens. When the stamens are united into a single group as in *Lobelia* they are termed Monadelphous. When in two groups as in the flower of the *Pea*, Diadelphous, etc.

Connivent.—In some plants, as in the flowers of *Potato*, *Tomato* or any other species of *Solanum*, the anthers lie close together, (but are not united), forming apparently a closed ring around the pistil. Stamens of this kind are said to be Connivent.

Syngenesious.—In flowers of the N. O. Composite (Fig. 82) the stamens when present are united by means of their anthers into a closed ring. Such stamens are designated Syngenesious.

Gynandrous.—In flowers of the N. O. Orchidaceae the stamens are borne on the Gynœcium. They are then said to be Gynandrous.

ANTHER IN PARTICULAR.

The anther is the essential part of the stamen and consists of four pollen sacs. The anthers may be variously situated and it is possible to make out four cases of insertion.

(1) Versatile.—When the anther lies horizontally on the tip of the filament so that it may "see-saw" and swing around more or less (as in *onethera*, and *Lilies*, etc.), it is called Versatile.

(2) Innate.—When the anthers stand erect on either side of the filament they are termed Innate.

(3) Adnate.—In some cases, as *Wild Ginger* (*Asarum Canadense*), etc., the anthers may stand erect on one side of the filament or the filament may appear as being continued through the anthers. Such cases are spoken of as being Adnate.

Confluent.—In *Monarda* species the anther cells diverge and are united at the apex of the filament. Anthers of this kind are termed Confluent.

APPENDAGES OF STAMEN.

The stamens are variously appendaged. In *Asarum Canadense* at the apex above the anthers there is a more or less triangular appendage. A somewhat broader appendage is present in species of *Viola*. In *oleander* the apex is plumose. In *Deerberry* (*Vaccinium stamineum* L.) there are two awn-like developments upon the back of the anther. In *Viola tricolor* L. the two stamens that project into the spurred corolla are spurred and possess a nectar-secreting apparatus. In *Milkweeds* (*Asclepias tuberosa* etc.), the anthers possess a wing-like appendage each cell of which contains a pear-shaped mass of pollen grains.

POLLEN GRAINS.

The pollen grains, singly, are so small that they require a compound microscope for their study. The yellowish dust which is shaken from the male flowers of the *Indian corn* or the flowers of the *Rose* or *Sunflower* is pollen grains. The yellowish dust upon the legs and other parts of bees and other insects is pollen grains which they have gathered from flowers for food for their young.

The form of the pollen grain is various and no doubt characteristic for each species. In the study of drugs they are very characteristic indeed. They may be round and almost smooth as in *Crocus*. (Fig. 93.) In the latter, however, there are present upon the surface numerous fine hairs (Fig. 93). In *Lavender* the pollen grains are marked by six distinct bands. From the portions between these bands the germinating tube of the grain exists (Fig. 94). In some cases, as in *Cloves*, the pollen grains are distinctly triangular with an irregular surface (Fig. 96). In *Matricaria* and other Composite the pollen grains possess a distinct prickly surface, as in Fig. 96.



GYNŒCIUM IN PARTICULAR.

Carpel.—The pistil being considered as a modified leaf, the term carpel or carpophyll has been used for denoting the same.

Placenta.—If we examine the pistil of the flower of the *Pea* we see a large elongated ovary and a short style and stigma. Upon the careful dissection of the ovary and comparing it with a transverse section we observe that the ovules are borne upon one edge that projects somewhat inwards. This portion that bears the ovules is called the Placenta.

Inner or Ventral Suture.—If you take a number of boards and make a box we find that if we wish to open the box or take it apart, the lines of least resistance are those in accord with the edges of the boards that we have placed together. The carpellary leaf (in flowers in which the ovules are contained inside the ovary) is folded so that the place of union is along the edges of the leaf. The lines of least resistance are along these united edges, so that when fruit is mature we expect separation here. This is called the Ventral Suture of the ovary. It is also called the inner suture because when a gynœcium consists of a number of pistils this portion is directed inward or at the center. The ovules, unless some change has taken place in the flower, are naturally borne along this suture.

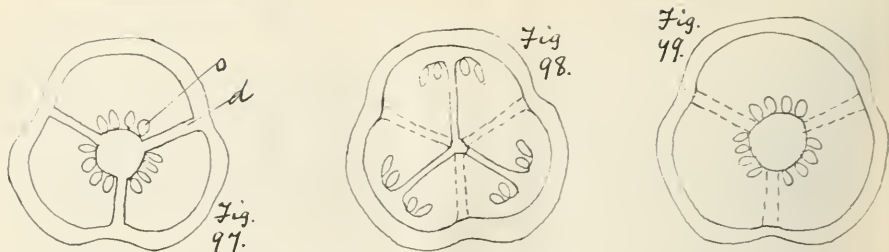
Fig. 94.—Pollen grain of lavender with its six broad bands extending from pole to pole.

Fig. 95.—Pollen grain of cloves when seen from above.

Fig. 96.—A pollen grain of German chamomile. The outer portion is marked with distinct spines.

Fig. 93 (a).—Pollen grain of crocus covered with fine prickles.

Fig. 93 (b).—Pollen grain of crocus with short germinating tube as may be frequently found in examining the pure Spanish saffron.



Outer or Dorsal Suture.—In some cases the portion corresponding to the midrib is very prominent and has the appearance of a suture, and in fact the fruit does open here sometimes at maturity as well as at the inner suture. The name *Outer or Dorsal Suture* has been given to this portion. In the pea and other leguminous plants both sutures are apparent.

Monocarpellary, etc.—There is a carpel for each pistil and the number of pistils or carpels in a gynœcium is indicated by the use of the following terms: When consisting of but one carpel the gynœcium is said to be Monocarpellary. When consisting of two carpels it is Dicarpellary. When of three carpels, Tricarpellary. When the number is many or indefinite, the term Polycarpellary is used.

Simple or Apocarpous.—When the carpels are separate from each other as in the Buttercup (species of *Ranunculus*), the gynœcium is said to be Simple or Apocarpous.

Compound or Syncarpous.—When there is a coalescence or cohesion among the carpels the gynœcium is spoken of as being Compound or Syncarpous. Such a condition we find in the flowers of Saxifrage, St. John's Wort (*Hypericum*), etc.

Dissepiments.—Where two or more carpels cohere it is evident that there are as many cavities or "cells" as there are carpels. The partitions between the cells are known as Dissepiments. These consist of the united portions of the carpels. That this is the case is often to be seen when the fruit matures, as separation into the number of carpels which enter into the formation of the gynœcium is not infrequent. The number of dissepiments depends upon the number of carpels except where but two carpels are present, when but one dissepiment is present.

False Dissepiments.—It sometimes happens that a false partition or wall is intruded from the midrib of the carpel, dividing a one-celled ovary into one that is two-celled. This is the case in the fruit of *Astragalus Canadensis* and in other species of the N. O. Leguminosæ. Such false partitions are termed False Dissepiments.

Axile Placentæ.—When no other partitions than the true dissepiments exist in the compound pistil, the placenta are borne in the axis of the flower, whence the term "Axile Placentæ" is used to describe this condition (Fig. 97).

Free Central Placentæ.—In the plants of the Pink Family (N. O. Caryophyllaceæ) the dissepiments are absorbed and the ovules are borne upon a central axis. The gynœcium of flowers of this kind are said to possess "Free Central Placentæ" (Fig. 99).

Parietal Placentæ.—In other cases, as in poppy, violet, etc., the placenta grow backwards to the midrib of the

carpel, carrying the ovules with them. Such placenta are spoken of as Parietal (Fig. 98).

OVULES.

Ovules are the products on the carpels which after fertilization generally become seeds. The number in each pistil is various. There may be but one, as in buttercup, or many, as in watermelon, etc. In form they are various and we distinguish the following principal forms: I, *Orthotropous*; II, *Anatropous*; III, *Campylotropous*. These three forms are distinguished from each other according to their manner of growth and their resulting forms. They are all alike in some particulars. They possess (Figs. 100-102) a foot-stalk (s); two coats, an outer (o), and an inner (i); a narrow orifice for the entrance of the pollen tube and called the foramen (f); a more or less egg-shaped mass inside of the coats called nucellus (n); in this nucellus is the embryo-sac (e); in the latter are a number of cells which are all more or less concerned in the act of fertilization. Chalazæ is the name given to that portion of the ovule where the nucellus and coats grow together (c).

I. The *Orthotropous Ovule* (Fig. 100) is one, as its name indicates, that is straight. It is neither bent nor is it upside down, but straight and erect on its foot-stalk. It is characteristic of plants of the N. O. Polygonaceæ, Urticaceæ, etc.

II. The *Anatropous Ovule* is one which stands upside down and is attached along the foot-stalk at its side. This portion of attachment is called a "rhaphe." Most of the ovules of flowering plants are anatropous, as *Linum*, *Amygdalus*, etc. (Fig. 101).

III. The *Campylotropous Ovule* is one that is bent upon itself. It is in much the same position as when one stoops over, as in Fig. 102. This form occurs seldom with the other two and is found in *Stramonium*, *Hyoscyamus*, etc.

PRACTICAL STUDIES.

13. Observe and compare the inflorescence on the following plants: *Phytolacca decandra*, pansy, catnip (*Neptata cataria*), aconite, geranium, wild carrot (*Daucus carota*) milkweeds (species of *Asclepias*), hydrangea, elder, spirea, evening primrose (*Enothera biennis* L.), dogwood (*Cornus Florida*), burdock (*Lappa officinalis*), chrysanthemum, golden rod, heliotrope. Determine the indefinite from the definite.

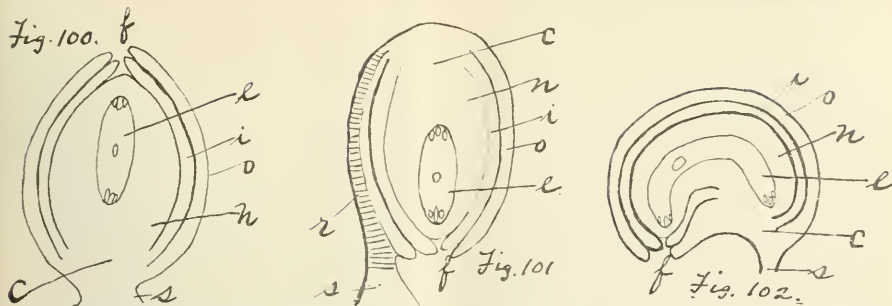
14. Examine the commercial flowers as follows: Orange Flowers.—Put them in lukewarm water for several hours until soft, or pour boiling water upon them until tender. Then dissect by means of two needles, which may be prepared by inserting two needles in two pieces of wood, each not larger or thicker than a lead pencil. Examine the parts beginning from outside and going inwards as regards the following points:

Of how many parts does the calyx consist? Are they separate or united? What is the length of the calyx compared to that of the corolla, and what is its color. How many parts to the corolla? How folded in the bud? Are they united? How many stamens? What is

Fig. 97.—Diagram illustrating axile placentation. (d) True dissepiments; (o) ovules.

Fig. 98.—Diagram illustrating parietal placentation. The dotted lines indicate the original wall of union. The placenta have directed their growth towards the outer wall and bear their ovules there.

Fig. 99.—Diagram illustrating free-central placentation. The dotted lines indicate where the dissepiments were arranged formerly. They have now become absorbed and disappeared.



there peculiar about the stamens? Give the reason for the peculiarity? Do the stamens possess filaments? What is their length? How many parts to the pistil? Has it a style? If so, how long is it? Is the ovary superior or inferior? What is there underneath the ovary? How many cells are there to the ovary? How many ovules are there? How are they attached? Are they anatropous, campylotropous or orthotropous? Examine some of the pollen grains underneath a compound microscope and draw the form. Draw a diagram of the orange flower.

15. *Fuchsia Flower*.—What is the color of the calyx? How many parts are there to it? How are they situated in the bud? Are they united to the ovary or free? What is the color of the corolla; of how many parts does it consist? Is there any adhesion or cohesion manifest? How many stamens are there? Are they exerted (i. e., protruded beyond the tube of the corolla), or included (situated inside)? Do they possess filaments? How are the anthers situated? What is the color of the filaments and anthers? How many parts to the pistil? What is the length and color of the style? How many parts are there to the stigma? How many cells to the ovary? How many ovules? What is the size of the ovules compared with those of the orange blossom? What is the color of the ovary? Is it a symmetrical flower? Is it zygomorphic or actinomorphic? Draw a diagram of the parts. Is the flower erect or pendulous? Why is it pendulous? What is there situated above the ovary? Of how many furrows does it consist? Is self-fertilization possible? Do insects visit the flower of fuchsia? If so what insects and for what?

16. *Garden Geranium Flowers*.—Examine single flowers for the following points: The calyx consists of many parts; are they united or not? How are they arranged

in the bud? How are they placed during the opening of the flower? What color do they possess? Of how many parts does the corolla consist? Are they separate or not? How are they arranged in the bud? How many stamens are there? Are they included or exerted? Have they filaments? Are they united? How much of them is united? Is there anything else peculiar about them? How are they situated with reference to the ovary? How many parts are there to the pistil? How many stigmas? How many carpels? How many seeds? Observe if there is any difference in the time of development of anthers and stigmas. Which matures first? Is the geranium protogynous or proterandrous? What are the transformations in a double geranium? Is it retrograde or progressive metamorphosis?

17. *Flowers of Garden Nasturtium (Tropaeolum majus L.)*.—Are the peduncles long or short? Note general position of the parts of the flower? See if there is any reason for this? How many sepals are there? Are they united? If so to what extent? What is their color? Are there any markings? Is there anything peculiar in one sepal? What does it contain? Open by means of a needle and note the height to which the contents rises and taste? What is it and its function? Of how many parts does the corolla consist? Are they all alike in shape and in position? How do the upper two differ from the lower three? Give all the prominent markings and developments that are produced by the plant to insure cross-fertilization by animal life. How many stamens are there? Are they of the same size? Are they exerted or included? How are the anthers situated? What is the direction of the anthers in the flower? Is there any adhesion or cohesion of stamens? If so what is the nature thereof and is it the same in all? How many parts to the pistil? How many stigmas? How many carpels are seeds?

RESTORATION OF RANCID BEEF TALLOW.—Eug. Dieterich recommends the following method: The fat is melted over an open fire and for every 100 parts are added 2 parts of prepared chalk suspended in 5 parts of lime-water. The mixture is boiled with frequent stirring, and the scum which forms is removed from time to time, so long as it continues to form, and until the tallow has a clear, golden appearance. Then are added 5 parts of dried and powdered salt, and the boiling and stirring continued five minutes longer. It is then strained through fine linen, or better, through paper by means of a sump-funnel. Tallow thus treated loses its rancid odor, but usually becomes a little darker.—(Ph. Ztg.)

Fig. 100.—Diagram of an orthotropous ovule. (f) Foramen; (c) funiculus or stalk of attachment to wall of ovary; (i) and (o) inner and outer coats of ovule respectively; (n) nucellus; (e) embryo-sac containing the nuclei or cells that are concerned in the production of the embryo and its products.

Fig. 101.—Diagram of an anatropous ovule. Letters have the same meaning as in Fig. 100. (r) Is raphe or ridge formed by the union of a portion of the stalk with the outer coat of a portion of the ovule.

Fig. 102.—Diagram of a campylotropous ovule. Letters have the same significance as in Fig. 100.

MACLAGAN'S AMMONIA TEST FOR THE PURITY OF COCAINE HYDROCHLORIDE.—If 0.06 Gm. of pure cocaine hydrochloride be dissolved in 60 cc. of distilled water and 2 drops of 10 per cent. ammonia water added, then the inside walls of the container rubbed with a glass rod, there will be, according to MacLagan, a copious separation of crystalline scales in about 15 minutes. Solutions of less pure cocaine remain clear or show only a slight deposit on the sides of the container. A salt containing more than 4 per cent. of amorphous alkaloid is stated to cause a milky turbidity on the application of the test. Several authors having reported varying results with this test, led Günther to test the statements of MacLagan with samples of cocaine from various sources. Not one gave a separation of crystals, all the solutions being about equally opalescent. Experiments showed, that the reaction depends above all on the size of the drops of ammonia water, which are subject to much variation. The author concurs in the statement made by Vulpinus in 1889, that the test is unreliable, that it is not known what impurities it is intended to show, and that there is no difference in physiological action between samples standing this test and those that do not. (Ph. Centrall.)

HOW TO MAKE A SODA FOUNTAIN PAY.*

BY F. de C. DAVIES.

My drug store was in Charlottetown, Prince Edward Island, and was started in the latter part of the year 1890. Finding trade rather slow, and looking around for something to increase my business, I thought that if I put in a good fountain, I would thereby advertise my drug business, my purpose being merely to use it as an advertising scheme. I was warned by others, who had tried it in the wrong way, (that is, by buying an old font, using five pounds of ice instead of fifty; using essential-oils in their syrups, instead of fruit juices; and not keeping things clean about their fountain) not to go into the business, for they could not make it pay.

There were not fifty people in Charlottetown who really knew the taste of a glass of pure soda water. I mean such soda as one can get in any first-class store in the United States. Therefore, I had before me a hard, up-hill climb, to educate a people to drink and know what a glass of soda was. I purchased a "Gaelic" apparatus of Tufts' manufacture, and at the very first I found the trade began to come to me by leaps and bounds, which fact I put down to my having the best fountain in the city.

In the matter of cylinders for soda I thought I would only have to get them charged by a local manufacturer who supplied the other dealers with soda. I soon found my mistake; the two special objections being the quality of the soda and the failure of supply. The inferior quality of the soda I attributed to insufficient pressure.

Having found by this experience that I could not expect to secure and keep a position ahead of the others by following their methods, I at once ordered a Sterling generator, with two purifiers attached, capable of generating sixty gallons of soda water at a time. While awaiting its arrival I studied up the process of making soda in every detail, and by the time it had arrived was well versed theoretically in the mysteries of the art. After setting the machine in order, which I did myself, without the aid of a mechanic, I proceeded to make soda, and the result was far beyond my expectations.

As I became more adept in the process of generating, I found less trouble in carrying out the programme of manufacture, until making soda was as easy as drawing it from the fountain. At last I found the secret of success, and the results showed at once, by the increase of trade and complimentary remarks of my customers regarding the improvement of my soda. "Davies' Soda" had become a household word. When I say that in a town of 12,000 inhabitants I have sold over eight hundred glasses of soda in a single day, I give a practical illustration of the result of my efforts.

In the matter of cleanliness, I soon found that one cannot be too careful. Also in the surroundings of the fountain, never allowing a speck of dust to lodge about the stand. In regard to the glasses, I decided to use the ten-ounce thin glasses, in preference to the standard heavy tumblers, giving my patrons a full glass of soda, having only a narrow head of foam on its top. This change was at once appreciated, and soon I had all the trade to which I could attend. I have seen my store filled to the doors with crowds of thirsty people, who a year previous did not know the taste of a glass of soda, clearly showing that there are two ways to do a thing, a right and a wrong way.

In the matter of juices, I have used the manufactured ones right along, supplied by the house from which I procured my apparatus, finding by experience that they were without doubt the best, and turning out according to the directions given.

My advice to those contemplating going into the soda water business is, if you cannot do it right, and have not

the inclination to look after every little detail personally, making your customers see that you have their interests at heart and are trying in every way to please them and give them what they are willing to pay for, viz., the best glass of soda water in town, then stay out of it, for you will in time lose all you have put into it.

Do not be afraid to use plenty of well-broken ice. It is a great mistake to try and economize in this respect. Study your clerk, and see if he takes with your patrons. Some young men have not the manner of serving customers to their satisfaction, which is a great drawback in the matter of trade, however nice your soda may be.

I always use a perfectly clean sponge in taking up any water, syrup, etc., which may be spilled about the counter or fountain, as it may be washed out at once, and looks as fresh as new.

In conclusion, I would say that whereas I started in the soda business as an advertisement, I ended in making it the paying part of the business, showing that with the best fountain, best soda (ice cold), best fruit juices, thin glasses, keeping everything clean beyond a doubt, and personal attention to every detail, I made my soda fountain pay.

PHARMACY.

PEDICULIN is a preparation intended for the extermination of insects, consisting, according to "Ph. Ztg." of 65 per cent. of limestone and 35 per cent. of crude naphthalin.

NERVOSINE.—A recent analysis of this preparation, which is on the market in pill form, shows it to consist of extracts of valerian, angelica and *Arenopodium*, of each 5 Gm., bitter orange 15 Gm., oils of valerian and angelica, of each 10 drops. (Ph. Post.)

EFFERVESCENT CIDER.—To 450 liters of cider 13 to 14 liters of honey or 10 kg. of granulated sugar are added and dissolved by stirring. After standing undisturbed one week, 2 liters of skimmed milk are added for clarification and then 18 liters of alcohol. After 2 or 3 days the liquid is clear and ready to draw off into bottles, which are well corked and the corks tied down. (Südd. Ap. Ztg.)

ARTIFICIAL STONE is manufactured in England by the following patented process: Calcined gypsum and cement are mixed with sifted ashes and potash, or other alkaline carbonate. The mixture is made into a plastic mass with water containing a little sulphuric acid and this pressed into forms under strong pressure. The blocks so obtained are immersed into an acidulated saturated solution of alum and are after drying ready for use. (Drog. Ztg.)

LANOLINE IN SKIN AFFECTIONS.—An ointment base described as easily absorbable, readily applied, aseptic and not too greasy consists of:

Lanoline	4 ounces
Vaseline	2 ounces
Lanoline soap	1/2 ounce
Aque rose	4 ounces

Dissolve soap in rose water, melt the other two ingredients and stir in the solution until the mixture is cold. More than one-half ounce of spirits and acid is not compatible. Lanoline will mix with own weight of extract of quillain, forming a cream which is miscible with water or alcohol, in any proportion; substituting for the extract a solution (1 grain to 1 ounce) of saponin in water and a few drops of alcohol, a creamy liquid is obtained which holds other substances in suspension and can be applied as a liquid. —(Herbert Skinner, Brit. Journ. of Dermatology.)

*Paper awarded Fourth Prize in the prize competition conducted during 1897, by J. W. Tufts, Boston, Mass.

SOLUTIONS OF ARGONIN.—The following process is given by F. Miehle (Pharm. Zig.) for making solutions of argonin readily and rapidly: Ten parts of cold water are first introduced into a flask, and then 1 part of argonin. The whole is then vigorously shaken until a uniform mixture is had, when sufficient boiling water to make up the desired quantity of solution is added, the whole being frequently shaken until complete solution occurs, when the mixture is strained through a piece of gauze.

TO REMOVE FRESHLY SPILLED INK FROM CARPETS.—First, take up as much as possible of the ink, with a teaspoon, if in considerable quantity, with a blotting-pad if not so plentiful, using the latter under either condition at the finish. Now pour cold sweet milk over the spot, and, after letting remain a moment, take up as before, repeating the process until the milk comes away only slightly stained with black. Finish by using cold water, into which some lemon juice has been strained. Finally, rinse with pure water, and dry off with a soft cloth, rubbing the surface slightly as the water is absorbed. Old ink spots may be removed by moistening a crystal of citric acid and rubbing the spot gently, repeating the operation until the spot vanishes.—(Nat. Dr.)

EPIDEMIC INFLUENZA.—Dr. Aladar Bekess (Wien. Med. Presse) says: "I use almost exclusively salipyrin not only in influenza but also in ordinary catarrhal affections, rheumatism and neuralgia. I prescribe as an evening dose 15 grains (seldom 20 to 30 grains), mornings generally one-half that amount, although at times I do give 10 to 15 grains. For children one-tenth to one-half the above-mentioned doses according to age. I never noticed any unpleasant after-effects from its use, and I was never compelled to resort to larger doses than those I have already mentioned. With this remedy I have obtained, without a doubt, the best results, which now and then were almost phenomenal in character. I noticed, as has also v. Mosengeil, that salipyrin must be continued for some time in order to achieve a good result. I prescribe 10 grains at night for 3 to 5 days after the fever has disappeared. Even after the fever has fallen to the normal the patient should be confined to his room for a number of days. The eventual complications are to be treated by the usual accepted methods of therapeutics."

INFLUENCE OF BISMUTH SUBNITRATE ON THE FORMATION OF ACID IN CIDER.—In countries, where cider is a popular beverage, it is seldom bottled, but is usually filled into casks, from which the daily supply is taken, until empty. It stands to reason that cider under these conditions must suffer more or less change in the course of time, through the action of the air. As a matter of fact, it becomes sour and is then called "hard." Dufour and Daniel (Comp. Rend.) have studied the influence of bismuth subnitrate upon cider, while exposed to air, and have found, that this is capable of retarding the formation of acid to a considerable extent. Bottles of 3 liters capacity were nearly filled with cider. To 3 of them 10, 20 and 40 Gm. of bismuth subnitrate per 100 liters of cider were added and the bottles placed, without corking, side by side with a fourth, to which no bismuth subnitrate was added. The following results were obtained:

	Without addition.	Cider with—		
		10 gm.	20 gm.	40 gm.
		per 100 liters.		
Aug. 24.	0.665	0.665	0.665	0.665
Sept. 21.	0.905	0.700	0.720	0.665
Oct. 19.	1.005	0.810	0.745	0.700

Further experiments with greater quantities of cider showed, that an addition of 10 Gm. per 100 liters suffices to retard the increase of acidity sufficiently for practical purposes. (Ap. Ztg.)

ERYTHROL TETRANITRATE is solid and crystalline, and melts at a temperature of 61°C (142° F.) When pure it is colorless, and if kept in a dark and moderately cool place is fairly stable. If exposed to warmth, and especially sunlight, it rapidly undergoes decomposition, turning yellow and giving off nitrous fumes. Its solubility in water is slight, but it dissolves readily in alcohol and in ether. It is a vaso-dilator and belongs to the group of which glycerol trinitrate, known familiarly as nitroglycerine, may be regarded as the typical representative.—(Br. & Col. Dr.)

TO PREVENT SPOILING OF PRESERVED FRUIT.—The cause of spoiling of preserves, which seldom permits keeping them through the winter, is perhaps always to be sought in the activity of bacteria, those which adhere to the inside of the jars, as the germs contained in the fruit itself are doubtless destroyed by boiling. In view of these considerations, Carles (Rep. Pharm.) has sought to improve the keeping qualities by a rational method of sterilizing and directs the following procedure: While the fruit or jelly is boiled, the glass or porcelain jars are first placed into water of 50° to 60° C. (120° to 140° F.) and then into boiling water, together with the parchment paper which is to be tied over the mouth of the jar when filled, and boiled during five minutes. The jars are then lifted out with tongs, the water poured out, and at once filled with the boiling fruit, then the hot parchment paper tied over immediately. To illustrate the advantages of this sterilization, the author prepared fruit by the new and by the usual, old method. On the expiration of six months there was a distinct difference in the taste, in favor of the sterilized fruit, which was also corroborated by disinterested persons. A further advance lies in the fact that no preserving agent needs to be added. The excellent condition of the preserves, even after several years, proves that, in spite of frequent assertions to the contrary, the fruit can be filled in hot, and that it is a mistake to let it stand in contact with the air for any length of time.—(Ph. Rundschau.)

NOTES ON THE CERASIN INDUSTRY.—Among recent improvements, the introduction of an emulsifier is of special interest (B. Lach. Chem. Zeit.) This consists essentially of two flat plates revolving in opposite directions, and between which the hot ozokerite, mixed with the requisite quantity of acid, is introduced by means of a central opening in the axis of the upper plate. It is stated that a more thorough admixture can be effected in this way than by any other means, and that there is a considerable saving of acid and an accelerated output. Many attempts have been made to discard sulphuric acid altogether in the preparation of cerasin, but these have speedily been abandoned. By extracting the ozokerite with benzene after treatment with bleaching powder, lycopodium powder, and magnesium silicate, there is an increased yield (up to 96 per cent.), but the product is inferior, being greasy and often having an unpleasant smell. A method of increasing the yield, but little known, consists in adding to the ozokerite from 5 to 10 per cent. of a very heavy mineral oil. This gives a more wax-like character to the cerasin, but the addition is objectionable when a white product is required. Attempts to extract the filter-press residue in the filter press itself, instead of in an extractor, have not given satisfactory results, owing to the following disadvantages: Loss of solvent, tediousness, and danger of manipulation, and the necessity of having filter presses of special construction. The ukase forbidding the use of cerasin candles in the churches in Russia has been repealed, to the great advantage of the Russian cerasin industry. Austria has now to take a second place to Germany in the export trade in cerasin, owing largely to the Austrian Land Bank monopolizing the sale of ozokerite and considerably raising its price.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Scale in Boilers.

(H. A. J.) See this Journal, Nov. 26, 1896, page 698, and Aug. 19, 1897, page 238.

Liquor Ferro Mangani Peptonati.

(F. W. M.) Formulas for this preparation may be found in the issues of the Era of Aug. 26, 1897, page 272, and Dec. 23, 1897, page 956.

Resinol.

(C. P. H.) Resinol is a proprietary preparation in ointment form, and is recommended by the manufacturers as a "harmless antiseptic and true skin anæsthetic." We cannot give the formula.

Registration in Greater New York.

(G. T.) The law requires that all pharmacists now in the practice of pharmacy in Greater New York must register with the secretary of the Board of Pharmacy before May 1st. The fee is \$2. The possession of a certificate of registration from the former New York City Board of Pharmacy does not exempt your friend from registration under the new law. The possession of such certificate exempts the holder from further examination, but unless he is registered as required by law he cannot lawfully practice pharmacy.

"Slag Vatten."

(O. O. R.) "Slag Vatten" is a Swedish domestic remedy for apoplexy or fits. It is generally prepared by distilling equal parts of rosemary and lavender flowers with dilute alcohol, although ordinary spirits of lavender is sometimes dispensed for it. Another formula, taken from a German authority, is the following:

Spiritus camphorati	100 p.
Liquoris Ammonii caustici,	
Liquoris Ammonii carbonici,	
Liquoris pyrooleosi aa.....	25 p.
Olei Juniperi bacc.	
Olei Succini rectif. aa.....	6 p.
Misce.	

Registration in Pennsylvania.

(J. F. R.) The pharmacy law of Pennsylvania requires that all persons applying for examination for certificate to entitle them to conduct and carry on the retail drug or apothecary business must produce satisfactory evidence of having had not less than four years' practical experience in the business. Assistant pharmacists must produce evidence of having had not less than two years' experience. All applicants are required to take the examination. The fee for examination and registration is \$3, with a triennial renewal fee of \$3. The secretary of the Board of Pharmacy is Chas. T. George, Harrisburg, Pa.

Status of Russian Pharmacy Certificates.

(A. D.) We cannot tell you just what Boards of Pharmacy in the United States will grant you registration without examination upon your standing as the possessor of an examination certificate granted by Russian authorities. We do know, however, that some of the State Boards are prohibited from recognizing any diplomas or certificates whatever, all applicants for registration being required to take an examination. The New York State Board of Pharmacy, concerning which you particularly inquire, recognizes no diplomas in lieu of examination.

Why not state your qualifications directly to the secretary of the Board of Pharmacy in the State in which you wish to locate and get from him the information you now desire?

Corn Colloidon.

(J. D.) There is nothing you can add to corn colloidon to prevent the evaporation of the ether. If the preparation is exposed to the atmosphere at all evaporation will surely take place. By securely corking the bottles with corks soaked in paraffine, evaporation may be retarded. No other solvent is suitable for this preparation. The following, taken from the Formulary of the German Apotheker Verein, recently published, is said to produce a satisfactory preparation:

Extract of Indian hemp	1 part
Salicylic acid	10 parts
Venice turpentine	5 parts
Dissolve by shaking in	
Colloidon	82 parts

When dissolved add

Glacial acetic acid	2 parts
---------------------------	---------

A liquid preparation containing no colloidon or ether is this one from T. M. Griffith's Non-Secret Formulas:

Solution of potassa	1 dram
Tincture of iodine	1 dram
Glycerine	4 drams

Water, enough to complete 1 ounce.

Remedy For Sweaty Hands.

(F. C.) A writer in a recent issue of the Jour. de Méd. recommended the following treatment for "sweaty hands:"

Tincture belladonna	1 dram
Cologne water	1 ounce

Mix. Add a little glycerine at the moment of using, and with the mixture rub the hands strongly. The hands should first be washed in soft water and thoroughly dried.

A soap for a similar purpose consists of:

Fat soap	15 ounces
Tannic acid	1 ounce
Starch, enough.	

Melt the soap on a water bath, and add the tannic acid. Mix thoroughly and then stir in enough starch to make the mass friable.

Shoemaker ("Hereditry, Health and Personal Beauty") gives the following formula, under the title "Moisture of the Hands:"

Oleate of zinc	1 dram
Subnitrate of bismuth	2 drams
Beta-naphthol	10 grains

Dust frequently over the surface.

Tire Cement Containing No Carbon Bisulphide.

(W. S. C.)

(1) Caoutchouc, fine shreds	1 ounce
Chloroform	20 ounces

B

Caoutchouc, fine shreds	1 ounce
Resin	3 drams
Venice turpentine	90 grains
Oil turpentine	4 fl. ounces

For the solution B, the rubber is shaved into small pieces and melted with the resin; the Venice turpentine is then added, and all is dissolved in the oil of turpentine. The two solutions, A and B, are then mixed.

(2) India rubber	15 grains
Chloroform	2 fl. ounces
Mastic	1½ ounce

Mix the india rubber and chloroform together, and when dissolved the mastic is added in powder. It is then allowed to stand by for a week or two before using.

(3) A recently patented "self-sealing" cement, according to an exchange, consists of glycerin holding gelatinous silica or aluminum hydrate in suspension. Three volumes of glycerin are mixed with one volume of liquid water glass, and an acid stirred in. The resulting jelly is diluted with three additional volumes of glycerin, and

from four to six ounces of this fluid is placed into each tire. In case of puncture, the internal pressure of the air forces the fluid into the hole, which it closes.

Harness Oil.

(R.) Several formulas may be found in this journal. Nov. 4, 1897, page 679. Here are some others:

- (1) Turpentine 1 ounce
Indigo, purified 1½ ounces
Ivory soap 2 ounces
Black soap 1 pound
Yellow wax 1 pound
Mix.
(2) Oil of turpentine 8 fl. ounces
Yellow wax 2 av. ounces
Prussian blue ½ av. ounce
Lampblack ¼ av. ounce

Melt the wax, add the turpentine, a portion first to be finely powdered Prussian blue and lampblack, and thin with neatfoot oil.

- (3) Best glue 4 ounces
Good vinegar 1½ pints
Best gum arabic 2 ounces
Good black ink ½ pint
Best isinglass 2 drams

Dissolve the gum in the ink, and melt the isinglass in another vessel in as much hot water as will cover it. Having first steeped the glue in the vinegar until soft, dissolve it completely by the aid of heat, stirring to prevent burning. The heat should not exceed 180 F. Add the ink and gum and allow the mixture to again rise to the same temperature. Lastly, mix in the solution isinglass, and remove from the fire. When used, a small portion must be heated until fluid, and then applied with a sponge, and allowed to dry on.

Red Sealing Wax.

(W. S. C.) The beauty and price of red sealing wax are determined by the quantities of shellac and cinnabar contained in it: only the finest qualities have cinnabar exclusively as a coloring principle. The inferior kinds contain very little shellac, but much common rosin, and no cinnabar at all, minium, colechoar, bole, or other cheap pigments being substituted. But too much rosin must not be added, or the wax will become too thin, drop too easily, and smoke very much when lighted. It is asserted ("Workshop Receipts") that chalk should not be used, because the acids of the shellac expel carbonic acid from it, and form a combination with the lime; but this happens only when the shellac is heated more than necessary, as no carbonic acid is set free if the shellac is only heated to the melting point.

Very fine reds are: (1) 12 parts shellac, 8 turpentine, 9 cinnabar, 2 oil of turpentine, 3 magnesia. (2) 11 parts shellac, 6 turpentine, 1 oil of turpentine, 1 chalk, 2 magnesia, 8 cinnabar.

Medium fine reds.—(1) 1 part shellac, 8 turpentine, ½ oil of turpentine, 3 chalk, 1 magnesia, 6 cinnabar. (2) 6 parts shellac, 4 resin, ½ oil of turpentine, 7 turpentine, 1½ chalk, 1½ gypsum, 4½ cinnabar. (3) 4 parts shellac, 6 resin, 6 turpentine, ½ oil of turpentine, 2 chalk, 1 gypsum, 4 cinnabar.

Fine red.—55 parts shellac, 74 turpentine, 30 chalk magnesia, 20 gypsum or zinc white, 13 cinnabar.

Ordinary red.—(1) 52 shellac, 60 turpentine, 44 pine resin, 18 chalk, 18 cinnabar. (2) 50 resin, 37½ red lead, 12½ turpentine.

Camphor Cream For Barbers Use.

- (R. S.)
White castile soap 120 grains
Boiling water, sufficient
Ammonium carbonate 120 grains
Camphor, powdered 120 grains
Tincture of opium 2 fl. drams
Oil of origanum 1 fl. dram
Water, enough to make 16 fl. ounces

Dissolve the soap in the boiling water, allow the solution to cool, add the remaining ingredients, and mix well.

Sometimes this is made with double the amount of

soap and is also made to contain 1 fl. ounce of oil of turpentine to the pint.

Here are some formulas for liquid preparations used by barbers under the same general title:

- (1) Tragacanth 6 parts
Warm water 576 parts
Glycerine 18 parts
Tincture of camphor 12 parts
Alcohol 12 parts
Menthol 1 part

This cream is applied as a cooling lotion after shaving, having first been diluted with some aromatic water.

- (2) Gum tragacanth 1 dram
Glycerin ½ ounce
Camphor water, enough to make 8 ounces

Soak the gum tragacanth in four or six ounces of camphor water, which should be freshly prepared. Add the glycerin and enough camphor water to make the whole measure 8 fluid ounces.

- (3) Quince seed 1 dram
Hot water 14 ounces
Borax 1 dram
Glycerine 2 ounces
Spirit of camphor 1 ounce
Oil of bitter almond 10 drops

Macerate the quince seed for several hours with the water; strain, add the glycerin, and in the mixture dissolve the borax. Dissolve the oil in the spirit of camphor and gradually add to it the mucilage and mix thoroughly.

Pharmaceutical Problem in Alligation.

(W. H. S.) asks for a solution of the following problem: He has two kinds of opium, one containing 16 per cent. and the other 8 per cent. of morphine, respectively. How much of each shall he use to make a mixture containing 12 per cent. of morphine? He also wants a rule for the solution of similar problems.

Solution of problem:

12	16	4	Proof:	4	parts at 16%	=	64	parts at 1%
	8	4		4	" " 8%	=	32	" " 1%
				8	parts mixture	=	96	parts at 1% =
					96 ÷ 12 = 8 parts at 12%.			

Explanation.—The gain and loss of the percentage strength of the two quantities of opium used as compared with the mean percentage must balance. Hence, we compare a percentage less than the mean with one greater than it, or 16 per. cent. with 8 per. cent. On every part of 16 per. cent. opium employed to make the 12 per. cent. mixture there is a loss of 4 per. cent. opium; on every part of the 8 per. cent. opium used, there is a gain of 4 per. cent. Now, as the loss and gain on equal parts of each are to each other as 4 is to 4, we must take parts (pounds, ounces, or drams) that bear to each other the same relative proportion, or as 4 is to 4.

When there are but two simples, one greater and one less than the mean quality, as in the above case, they admit of but one combination, but when there are several simples of differing qualities, they may be variously combined, and hence several answers to such a question may be found, and all will be correct; for various mixtures of the same value or strength may be made. Thus, if a merchant have sugar at 4, 6, 8, and 10 cents per pound, and wish to form a mixture of the whole worth 7 cents, it is obvious that he may vary the quantity of either ingredient that is less or greater than the mean rate (7 cents) by using less or more of the other pair of ingredients. He may form a mixture of the 4 and 8 cent that shall be worth 7 cents, and another of the 4 and 10 cent, and still others of the 6 and 8, and 6 and 10; and these mixtures being all of the same value, he may form of them a great number of combinations by using various proportions of the several mixtures. Specific rules for the solution of problems in alligation may be found in any book on practical arithmetic. We cannot repeat them here.

Developers For Dry Plates.

(O. B. L.)

(1) Hammer's Solutions.

No. 1.

Pure water	16 av. ounces
Sulphite of sodium crystals	4 ounces
Oxalic acid	20 grains

Dissolve, and add of pyrogalllic acid one ounce.

No. 2.

Pure water	16 ounces
Sulphite of sodium crystals	4 ounces
Carbonate of sodium crystals	4 ounces

For use take half an ounce of each, No. 1 and No. 2, and from five to eight ounces of tepid water in cool or cold weather, or from six to twelve ounces of cold water in warm weather.

(2) Seed's Pyro Developer.

No. 1.

Make a stock solution of sulphite of soda, to test 60° with the hydrometer; allow to settle perfectly clear; then take of

Sulphite of soda solution	16 ounces
Pyro	1 ounce
Sulphuric acid	15 drops
or oxalic acid	10 grains

No. 2.

Salt-soda solution hydrometer test 40°.
To develop, take of

Water	12 ounces
No. 1	1 ounce
No. 2	1 ounce

In warm weather use more water; in cold weather, less.

(3) Sulphite of soda 4 ounces
Carbonate of soda (large crystals) 2 ounces
Yellow prussiate of potash 2 ounces
Water 60 ounces

Take two ounces of the above and five grains of dry pyro for a 5 x 7 plate. This is a very fine developer for any plate.

(4) Seed's Hydrochinon Developer.

No. 1.

Hydrochinon	1 ounce
Sulphite of soda crystals	5 ounces
Bromide of potassium	10 grains
Water (ice, or distilled)	55 ounces

No. 2.

Caustic potash	180 grains
Water	10 ounces

To develop: Take of No. 1 four ounces, of No. 2 one-half ounce. After use pour into a separate bottle. This can be used repeatedly and with uniformity of results by the addition of one dram of No. 1 and ten drops of No. 2 to every eight ounces of old developer.

(5) Carbutt's Pyro Developer.

No. 1. Pyro Stock Solution.

Distilled or ice water	10 ounces
Oxalic acid	15 grains
Bromide potassium	30 grains

Then add Schering's pyro, 1 ounce, and water to make 16 fluid ounces.

No. 2. Stock Soda Solution.

Water	10 ounces
Sodium sulphite crystal	2 ounces
Sodium carbonate crystals (or dry gran, 1 oz.)	2 ounces
Potassium carbonate	1 ounce

Dissolve, and add water to make measure 16 fluid ounces.

No. 3. Bromide Solution.

Bromide of sodium or potassium	$\frac{1}{2}$ ounce
Water	5 ounces

Pyro Developer.—Dilute 2 ounces of stock No. 2 with 7 ounces of water for cold weather, and 10 to 12 of water in summer. To 3 ounces of dilute No. 2 add $\frac{1}{2}$ to $\frac{3}{4}$ drams of No. 1. The more pyro the denser the negative, and vice versa. No yellowing or fogging need be apprehended if our directions are followed. Development should be continued until the image seems al-

most buried, then wash and place in fixing bath.

Here are two formulas for combined toning and fixing solutions:

(1) Ho Toning and Fixing Solution.

Hot water	$\frac{1}{2}$ gallon
Hypo	16 ounces
Sulphocyanide of ammonia	2 ounces
Acetate of lead	6 drams
Nitrate of lead	6 drams
Citric acid	4 drams
Powdered alum	4 drams
Pure chloride of gold	12 grains

(2) Combined Toning and Fixing Bath for Gelatine-Chloride Paper:

Hyposulphite of soda	8 $\frac{1}{2}$ ounces
Citric acid	3 drams
Acetate of lead	3 drams
Sulphocyanide of ammonium	7 drams
Alum	2 drams
Chloride of gold	15 grains

SOLUBLE STARCH.—A Wroblewski (Ber., Jour. Soc., Chem. Ind.), restricts the term "soluble starch" to the first decomposition product of starch, which gives a pure blue coloration with iodine and does not reduce Fehling's solution. Amyloextrin is a decomposition product of soluble starch; iodine colors it reddish-brown, and it somewhat reduces Fehling's solution. The best method for preparing soluble starch is as follows: Triturate 100 grams of the best rice starch with small quantities of 1 per cent. caustic potash solution and let stand 2 to 4 hours; repeat this process until the whole has attained a volume of 600 to 800 Cc. Heat on the water-bath with constant shaking until the jelly-like mass has become perfectly fluid, boil over the naked flame for 20 to 30 minutes, filter, add acetic acid to feeble acid reaction, precipitate with an equal volume of 95 per cent. alcohol, again dissolve and precipitate. Finally dissolve in a little water, pour in a thin stream with violent stirring into a large volume of absolute alcohol, wash with absolute alcohol and ether, and dry in vacuo. The resulting snow-white substance contains very little ash, gives a pure blue with iodine, does not reduce Fehling's solution, and is soluble in water to the extent of 4 per cent. The neutralization by acetic acid is to facilitate washing only; the alkali is not combined with the starch, its action being merely catalytic. Soluble starch is obtained by the first hydrolysis of starch, effected also by the action of diastase, acids, and water, but with these reagents, hydrolysis proceeds further. By long boiling with dilute potash, a substance is obtained with a very feeble reducing action on Fehling's solution.

Syniewski's method for preparing soluble starch is as follows: Add 50 grams of commercial sodium peroxide in small quantities at a time to 500 grams of well-cooled water; bring into this solution 50 grams of potato starch rubbed up with 500 grams of water. In an hour add alcohol of 95 per cent., dissolve the precipitated mass in cold water, and neutralize the cooled solution with acetic acid; again precipitate, dissolve, and acidify. On repeating this process several times, a substance is obtained containing only traces of ash. From the aqueous solution, on standing, a small yellow flocculent deposit separates, leaving a completely clear liquid. From this, the starch is precipitated by alcohol; it is then ground with alcohol, washed on a filter with anhydrous ether, and dried by warming in vacuo. The product was a snow-white amorphous body without taste or smell, giving, on analysis, figures corresponding with the formula $2C_{12}H_{22}O_{11} \cdot H_2O$. It is soluble in cold water; solutions stronger than 12.5 per cent. could not be obtained at the ordinary temperature, but it appears to be soluble in hot water in every proportion. It gives a pure blue coloration with iodine, which property is not changed by prolonged heating on the water-bath, and it does not reduce Fehling's solution. At 20°, the specific rotation is 182°.66 for 2.5 per cent. solutions, and increases to 189°.5 at 12.5 per cent. strength. This increase in optical rotation with increasing concentration, it is alleged, accounts for the divergent results obtained by Nageli, Brown and Morris, etc. The yield of soluble starch obtained by this method is almost quantitative (99 per cent.), and the loss is due to purely mechanical causes.—A. C. W.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Ellas H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblenz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Phar.D.
Albert E. Ebert, Ph.M., Ph.D.	Charles W. Parsons, Ph.C.
James M. Good, Ph.G., M.D.	Edgar L. Patch, Ph.G.
Arthur L. Green, M.D., Ph.D., Ph.C.	George F. Payne, Ph.G., M.D.
Charles F. Heebner, Phm.B., Ph.G.	T. D. Reed, M.D., C.M.
George B. Kauffman, B.Sc., Phar.D.	Edsel A. Ruddiman, Ph.M., M.D.
E. J. Kennedy, Ph.C.	Henry H. Rusby, M.D.
Henry Kraemer, Ph.G., Ph.D.	Otto Sahli, A.M.
Edward Kremers, Ph.G., Ph.D.	L. E. Sayre, B.S., Ph.M.
	Wilbur L. Scoville, Ph.G.
	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Otto A. Wall, Ph.G., M.D.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in **THE PHARMACEUTICAL ERA**, and the **QUIZZES** and **EXAMINATIONS** are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and **DIPLOMAS** are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the **ERA**, tuition fees and a blinder for preserving copies and lectures.

LECTURE NO. 43.

First Aids to the Injured.

By STEWART LEROY McCURDY, A.M., M.D.

Professor of Anatomy and Oral Surgery, Pittsburg Dental College;

Dean of Pittsburg School of Anatomy; Orthopedic Surgeon to Presbyterian Hospital, Pittsburg, Etc.

PART I.

INTRODUCTION.

Next to the physician, no other person is so frequently called upon to administer to the temporary wants of the injured and sick as the druggist.

The injured and the faint are carried to the nearest drug store for aid, and in cases of poison the druggist is asked for the antidote. The child who has swallowed carbolic acid or laudanum, or is suffering with croup, or is otherwise dangerously ill, is ministered to by the druggist until the physician arrives, while it not infrequently occurs, especially in small towns, that the physician is in the country making a visit when his services are most needed, and lives are saved, suffering relieved, and the course of treatment abbreviated by the prompt and intelligent administration of "*First Aids*."

It is not intended that the druggist should do more than minister to the temporary wants of the injured, nor should he issue any more than such drugs as would temporarily relieve the suffering, restore the faint, or make comfortable those for whom he is called upon to prescribe.

The nearest, or the preferred, physician or surgeon should be sent for immediately after the accident, for in no case can it be positively determined whether a given case will be trivial or not, and for any one but a physician to assume responsibility for the outcome, is placing such an one in a position not only to be criticised by relatives, friends, and the curious crowd, but there is danger of actual prosecution for meddlesomeness and for the assumption of power invested in none but the physician or surgeon.

Do not do too much. Control hemorrhage, place a distorted limb or the injured parts in a normal, and hence the most comfortable position. Remove the injured to a neighboring house, store or shelter, and above all keep the curious crowd away, for air is of most importance. In cases where the injured is in the street, a good way is for some one near the injured to ask the first row of people to catch hands and shove back. If this does not

make a large enough space, invite enough of the second row to join the circle to get the crowd back at least ten feet in every direction from the sufferer. Insist that you care nothing for the crowd but that you are fighting for the injured. The principal thing in cases of accident and injury is coolness, and the next is determination, and individuals of this character should take command, give orders and see that they are carried out. A sufficient number of assistants should be deputized to handle the patient, who may be placed upon a stretcher, a padded board, or something which will allow him to be carried to a place of comfort or seclusion, to the drug store or the surgeon's office.

Screaming and excitement must be avoided, even relatives of this character should be removed from the presence of the injured. A written note, or a messenger with a knowledge of the nature of the trouble, should be sent to the physician, so that he may have some idea as to what he should take with him, for many lives have been saved by the timely administration of antidotes to poisons and the prompt control of hemorrhage, and when a second trip is necessary, valuable time is consumed.

Until the physician arrives, temporary aids and comforts should be given, disarranged clothing adjusted or removed, and the injured parts exposed so that a thorough examination can be made. Unless there is some special reason for making applications to the injured part (as to control hemorrhage), dopes, tobacco quids and other materials of this nature should be kept away, for infection is likely to occur from the application of such substances to an open wound. Whisky and other stimulants should be given in moderation, if at all, as they are liable to produce stupor and mislead the doctor, and otherwise do injury. It is better to do nothing than to do too much. Make an investigation as to the actual conditions and administer to them.

For convenience of study the subject matter of these lectures will be subdivided as follows:

1st. Surgical Emergencies.

- (a) Wounds.
- (b) Railroad and machinery accidents.
- (c) Sprains, dislocations and fractures.
- (d) Hemorrhage.
- (e) Burns, scalds, frost bites and freezing.
- (f) Injuries to brain and skull.
- (g) Internal injuries.
- (h) Foreign bodies in eye, ear, nose and throat.
- (i) Bandaging.

2d. Medical Emergencies.

- (a) Unconsciousness.
- (b) Fits and convulsions.
- (c) Sunstroke and effect of heat.
- (d) Electricity accidents.
- (e) Drowning.
- (f) Suffocation from gas.
- (g) Strangulation and choking.

3d. General Remarks.

- (a) Transportation of injured.
- (b) Supplies for emergencies.
- (c) Poisons and antidotes.

SURGICAL EMERGENCIES.**General Consideration.**

Antiseptics.—Introductory to a consideration of wounds and their treatment, attention must be called to antiseptics, and the modern method of wound treatment from a surgical standpoint. It is the management of a wound immediately after its reception that determines its subsequent history.

When a wound is kept perfectly clean and free from old handkerchiefs, filthy clothing, and other objects which may be full of bacteria, it heals promptly and a compound fracture becomes a simple one, but when it is infected by the introduction of bacteria, pus is the result, and weeks are required for the repair, when days would be sufficient provided infection does not occur.

With this idea clear in your minds, you will be able to appreciate the importance of care and cleanliness in management of wounds where infection may occur.

Treatment in general would then appear to be: (1st) Cotton, gauze or clean linen, or soft muslin wet in boiling water, and applied to the wound. (2d) When hot water cannot be procured, a 1 to 3,000 solution made from tablet of bichlorid of mercury, or carbolic acid solution 1 to 50 will serve well. Dilute alcohol or whisky is a good antiseptic. Be sure that your hands are clean and that none of the old clothing remains about the wound. Keep the wound covered with cloths, gauze or cotton, immersed in one of the above named solutions, until the doctor arrives.

WOUNDS.

A wound is a solution of continuity as a result of an injury. Wounds are *simple* when they remain local, have a tendency to recover instead of spread to other parts, and produce no appreciable constitutional disturbance; and are known as *infective* when they have been inoculated with bacteria, in which event the tendency is to spread or involve other parts, and become general, resulting usually in systemic disturbances. These conditions may be considered varieties of inflammation.

Formerly inflammation was considered a dangerous condition, but as it is now understood, it is an effort on the part of nature to protect and repair the injured part, and it is only when the wound has been inoculated with some variety of virulent microbe (bacteria) that it becomes alarming.

Wounds are divided into (a) contused, (b) lacerated, (c) incised, (d) punctured, (e) poisoned, and (f) gunshot.

(a) *Contusion* is commonly known as a bruise, and is applied to injuries of the soft tissues, due to blows, as from a fist, causing a "black eye," or from a stone or

whip. There is generally some discoloring of the parts due to transference of red corpuscles from the small blood vessels into the surrounding tissue, and swelling is generally found, also due to the escape of serum and corpuscles from the small blood vessels. The pain is caused by the actual injury of the parts and the pressure made by the corpuscles and serum. A contusion may be quite simple where a slight abrasion is present, or it may involve an extensive area, as may be seen in railroad accidents.

Treatment for simple contusions is rest, simple lotions, as petrolatum, to protect the parts from the air and prevent infection. For extensive contusions applications of cold for the first few hours, followed by heat, after the acute stage, is a good dressing. Anodyne lotions are also beneficial, since they not only act upon the capillary blood vessels and produce local anesthesia and thus relieve pain, but they are also, as a rule, antiseptics, and the wound remains a simple one.

(b) *Lacerations* are tears of the soft parts made by some blunt object, as may result from railroad and machinery accidents, those produced in fights or made by a policeman's mace. Here the general rule as to the management of all wounds should be observed, viz., the use of clean cloths, surgeon's cotton or gauze, which has been in boiling water, and the keeping of all filthy material from the wound. Slight oozing may be controlled by hot applications. Soap liniment, dilute alcohol, whisky or laudanum are the best lotions, both to control hemorrhage and to prevent inoculation. Adjust the lacerated parts if possible, and hold them in position by the use of compress and bandage, care being used not to apply the bandage too tightly.

(c) *Incised Wounds* are clean cut, made by some sharp instrument, as a knife, and their length is greater than their depth. When small and not too deep, or when not attended with alarming hemorrhage, adjustment of the edges by the use of adhesive plaster will be sufficient. When extensive, the best that can be expected as a temporary aid is to make an effort to adjust the parts and control the hemorrhage by direct pressure. It must be remembered that incised wounds bleed more freely because a sharp instrument cuts the blood vessels off squarely, while in lacerations the vessels are usually torn and bleed less freely. The method of adjusting the edges of an incised wound is to first adjust adhesive plaster to one lip of the wound, from or near the center, and while the lips of the wound are adjusted by the tips of the thumb and fingers of one hand, the plaster is drawn across and permitted to adhere to the other lip.



Fig. 1.—Closing Wound With Adhesive Plaster (after Dulles).

Enough other plasters are applied in the same way to neatly adjust the skin at all points (Fig. 1). Adhesive plaster should not be used on parts which contain much hair, until they are shaved, or the removal of the plaster will be more painful than the first dressing. Remember always to get the surgeon if possible. Also remember that everything should be clean, including the hands.

(d) A *Punctured* wound is where the depth is greater than the surface length. It may be incised, when made

by a cutting instrument, and lacerated when a hook or other similar instrument pierces the soft parts. Punctured wounds are made by pins, needles, wire nails, thorns, splinters, knives, hooks, glass, etc.

Pins and needles usually produce a harmless wound, except when they puncture an important cavity or blood vessel. In the former case removal will effect a cure unless inoculation results, in which case serious and possibly fatal inflammation may result. When a blood vessel is punctured, internal hemorrhage may occur, producing a condition known as false aneurism, which will require an operation. When a needle is driven entirely into the soft parts, or broken off below the skin it is difficult to remove. If the course of the needle is such as to make it possible, the incision should be made half an inch or so from the point of puncture, and the knife will strike the side rather than the point. To cut directly through the point of puncture would theoretically be the best method, but in practice it furnishes many fruitless efforts to locate the object of search. Too much damage should not be done to soft parts in a search for a missing needle, since it is inorganic matter and its presence causes little ill result.

Wounds made by thorns and splinters furnish a different condition, since wood is organic matter, never becomes encapsulated, but acts as an irritant and should be removed at once. After removal little trouble results, and healing takes place promptly. Large splinters produce extensive laceration, and after their removal the wounds should be treated as other lacerated wounds. Splinters under the nails are troublesome to remove and may require the scraping or splitting of the nail before they can be extracted. A most dangerous variety of punctured splinter wound is when the missile enters an important cavity of the body, as the eye, abdomen, or pleura. In these cases the surgeon's knowledge, judgment and skill must be brought into action, and temporary treatment should end after an effort is made to remove the missile.

Pieces of glass should be removed if this can readily be done, but glass causes no injury to the parts and should be allowed to remain until the arrival of the surgeon, when there is any difficulty attending the removal.

When fish hooks have entered the soft parts, the point should be pushed out through the skin. The eye will prevent its being carried entirely through. The hook may be broken either by a pair of pliers or wire cutters, preferably the latter. It is then drawn out.

Nails, especially the old cut nails, may produce a most troublesome wound. Infection is quite common and erysipelas or other infective inflammation may result, hence the importance of first treatment. After the removal of the nail the sinus should be injected with ichlorid of mercury solution 1 to 5,000, alcohol 50 per cent., or other antiseptic solution. The wound should be kept open rather than closed, to afford drainage.

(e) **Poisoned Wounds** are those which are inoculated at the time they are produced, and must be considered a variety of infective inflammation from the start. In certain wounds there may be a question whether infection has taken place, as bites of dogs, cats and rats may result in infection, but as a rule they do not. In bites from venomous serpents, stings from bees, spiders, scorpions, centipedes and tarantulas, more or less infection always occurs.

Stings from bees or spiders produce swelling and more or less local disturbance, requiring local applications, but death seldom follows.

Stings from tarantulas, scorpions, centipedes, and bites of copperheads or rattlesnakes are poisonous, absorption taking place in a few minutes, and death frequently follows.

The local treatment consists in the use of cauterization by acid, strong ammonia, pure alcohol or with a hot needle. The extremity should be encircled above the wound with

a rubber band or very tight bandage. The old practice of producing immediate drunkenness can do no harm, and can be recommended, since the fear the patient would have in a normal state is removed. Some recent writers say that there is no such thing as hydrophobia, as a distinct disease due to inoculation by a rabid dog, but that the disease is fear and that people die from fright rather than true disease. Whether this be the true view or not it is a fact that the bacterium of hydrophobia has not been isolated as yet.

Dog bites are seldom poisonous, and even in those dogs which appear mad on the streets, few are really so. On more than one occasion the writer has seen a dog chased down one street, up an alley, and about the town for an hour or more, by boys, men and policemen, with women and children running in every direction, until the animal was finally shot, or beaten to death with a club. What dog would not run with the town populace after him, and what brute would not froth at the mouth after such a chase? All dogs which appear mad and have bitten some one should be caught and penned up for some days to definitely determine their condition, in order that proper treatment may be applied to the bitten person in the event that the animal is found to have hydrophobia.

(f) **Gunshot Wounds** almost always involve deep structures, and little can be done, or should be attempted, until the arrival of the surgeon. Rest and antiseptics, or pressure to control hemorrhage, is about the limit of the ability of laymen to do for these cases.

RAILROAD AND MACHINERY ACCIDENTS.

In addition to the foregoing typical varieties there are certain classes of more severe injuries produced by machinery, or resulting from railroad and street car accidents, and in many other ways.

Among the more severe injuries we find pinched or crushed fingers, hands, or arms, occurring while coupling cars, injuries to the head or other parts of the body by falling from a moving train, fingers caught in cog wheels or other machinery and torn off, or severely lacerated, or an entire extremity may be extensively lacerated or torn off, accidents from buzz saws, etc. Sprains, fractures, dislocations, and internal injuries, as fracture of ribs or pelvis, and resultant injuries of the soft parts within, are also frequently seen in railroad practice.

Hemorrhage is not as a rule very profuse, since laceration also tears the blood vessels instead of cutting them, and bleeding is thus prevented. If however, hemorrhage is considerable, it should be controlled as previously suggested and before the wound is closed.

Never under any circumstances clip off parts which appear almost torn away, as such parts may, after adjustment, unite to the proximal field and serve an admirable purpose in protecting the stump during repair. At any rate the surgeon should be the judge of this matter, rather than any one before him.

When a splint is required to support the injured area, it may be made from a cigar box, or any board of the proper thickness, shaped with pen-knife, saw or hatchet. After padding, it is placed in position and held by a bandage.

Note to students: no recitation blank will be issued for this lecture.

SPHACELOTOXIN.—According to Jacoby (Arch. f. exp. Path. u. Ph.), the specifically active constituent of ergot is a nitrogen-free resin, which he calls sphacelotoxin. It is stated to be active in very small quantities and to have the property of combining with basic, and, under circumstances, also neutral or feebly acid, bodies. Of all sphacelotoxin preparations those best suited to practical use appear to be chrysotoxin and its readily soluble sodium compound.—(Südd. Ap. Ztg.)

LECTURE NO. 44.

Botany.

BY HENRY KRAEMER, PH. G., PH. D.

POLLINATION AND FERTILIZATION.

BIOLOGY OF THE FLOWER.

By the biology of the flower we mean the study of the life processes thereof. In the biology of the flower all of the elements that we have thus far considered, viz., gynoecium, androecium, perigone, bracts and nectar apparatus, play a rôle. Each in its sphere (when present) contributes something which shall cause the distribution of the pollen and aid in its journey to the proper place (viz. stigma) and finally effect fertilization of the egg cell and the production of seed.

Now inasmuch as there are two operations concerned in this process of the production of the seed, and furthermore in that they are widely different from each other—in fact, the effect of one begins where the other ceases, we divide the process which begins with the dispersion of pollen from the anther and ends in the production of seed into two parts or stages, viz., I. Pollination, and II. Fertilization.

I.—Pollination consists in the dehiscence of the anther; ejection of ripe pollen; mode of journey of pollen to the stigma; finally its deposition upon the stigma of the flower and germination.

II.—Fertilization is the act of union of the generative nucleus of the pollen tube with the egg cell of the embryo sac. This is the beginning of the act which has for its object the production of sexual seed.

Pollination must precede fertilization, but fertilization does not necessarily follow pollination, as we shall see later.

DISCHARGE OF POLLEN.

At the time that the ovules, of the species to be pollinized, are ripe, the anthers ripen and discharge their pollen. This discharge of pollen is effected in various ways:

(1) It may occur by the longitudinal separation of the two contiguous pollen-sacs from each other, as is more usually the case, as in Violet, Magnolia, *Onethera*, etc.

Now it is at once apparent that the pollen-sacs must open in such a manner (particularly in flowers that are visited by insects for the nectar they contain) that the pollen will fall upon the insects.

(a) We observe in flowers which secrete their nectar between the ovary and stamens that the anthers are adnate, and that the openings for the discharge of pollen are directed inwards, as in *Gentians*, *Violets*, etc.

(b) In flowers where the nectar is secreted outside of the whorl of stamens the anthers are adnate, but the openings for the discharge of pollen are directed outwards as in *Colchicum*, *Iris*, *Laurel*, *Magnolia*, etc.

(2) In most plants of the N. O. Solanaceæ and N. O. Ericaceæ (*Uva Ursi*, etc.), and other plants, the pollen is discharged by means of a pore situated at the apex of the anther. This may easily be seen by pressing an anther of Potato flower, or Horse-nettle (*Solanum Carolinense*) or other allied plants, between the fingers and noting the fine stream of pollen which exudes.

(3) In other plants the discharge of the pollen is effected by means of a valve, i. e., the upper portion of the anther is divided transversely into two portions, the upper one being in the nature of a trap door. The number of such valves may be restricted to the number of anther sacs, as *Berberis*; or there may be quite a number, as in the flowers of *Cinnamon* (Species of *Cinnamomum*) or *Camphor* (*Campophora officinalis*).

TIME FOR DISCHARGE OF POLLEN.

There is a good deal of variance in the time consumed in the discharge of the pollen. In some cases the pollen

sacs open quickly and the pollen is discharged, like the powder from an insect powder gun when compressed. In fact in most cases the opening of the anther-sacs is performed rather quickly during dry weather.

DEPOSITION OF POLLEN.

In some cases the position of the anther is such that the pollen lies in it protected until disturbed by an insect visiting the flower for nectar, when the insect becomes dusted and covered with the pollen. In a very large number of plants the pollen is stored in special parts for future use. In the flowers of the N. O. Composite it falls upon the outside of the stigma (not the stigmatic surface). In species of *Papaver*, *Rosa*, *Ranunculus*, etc., it falls in depressions of the petals. In *Viola Tricolor* it falls upon the hairs in the spurred petal. In the *Pea* and other flowers of the N. O. Leguminosæ it is lodged in the hollowed apex of the keel.

PROTECTION OF POLLEN.

It is apparent that after the pollen has been discharged and deposited it must be protected from rain and from animals that will do the plant no good, but rob it of its storehouse. The pollen grains are protected by the following means:

(1) The plant produces bell-shaped corollas, which hang down with the mouth towards the earth. The rain or moisture thus will run off the outside of the perigone as off a roof. Bell-shaped corollas are produced in the flowers of *Convallaria*, *Vaccinium*, *Campanula*, *Atropa*, *Digitalis*, etc. That this is an evident device (for one thing) for the protection of the pollen grains, is at once apparent when we observe that after the discharge of pollen and the fertilization has taken place the flower reverses its position and the stalk becomes erect. Further, in flowers that are in racemes, as in species of *Poplar*, *Alder*, *Hickory*, *Butternut*, *Walnut*, etc., the inflorescence becomes pendulous just before the dehiscence of the anthers.

Some flowers are erect during the daytime, but at night and during rain they bend on their stalks, as *White Potato* (*Solanum tuberosum*); *Roberts Geranium* (*Geranium Robertianum*), *Phœasant's-Eye* (*Adonis vernalis* L.), etc.

(3) In some cases the flower may assume such a position that it lies directly under a foliage leaf, as in *Lime tree* (*Tilia Europæa* L.), *Touch-me-not* (*Impatiens pallida* Nutt.), *Hollyhock* (*Althæa rosea* Cav.), etc.

(4) In *Iris* the three stigmas become large, outspreading, (petaloid) and each protects upon the under side an anther with its pollen.

(5) In flowers like species of *Phlox*, *Primula*, etc., the corolla tube at the throat is much contracted. The air of the tube is not easily replaced, and as this must be first accomplished before water can enter, the pollen grains are protected.

(6) In flowers of *Colchicum* (*Colchicum autumnale*), species of *Rosa*, *Nymphaea*, *Magnolia*, etc., the flowers are only open during sunshine, but close immediately during rain.

(7) In some flower-heads of plants of the N. O. Composite that possess both tubular and ligulate flowers (as *Calendula*) the involucre bracts bend over and enclose the flowers during rainy weather and at night. In *Taraxacum officinale* the involucre scales enclose the flowers during times of rain and at night. The closing movement of all of these flowers is frequently very rapid in case of coming rain.

MATURE STIGMA.

So much for the discharge and protection of the pollen, and before following it on its journey to the stigma, let us inquire is the stigma ready to receive this pollen. If

so, what is there to insure its holding the pollen after it receives it. When the pistil in all its parts is mature, the stigma occupies such a position that it will receive the pollen in the manner that the plant has already arranged for. The stigma is moist with a sugary solution to which some of the pollen grains when once they touch it will stick. The pollen grains, on the other hand, possess various forms of sculpturing (Figs. 93-96), as grooves, spiny projections, etc., so that they will adhere to the stigma when they touch it. The stigmas are either large and fleshy or beset with numerous hair-like growths, or somewhat feathery, as in the Grasses. The form, position and movement are such as to insure the greater number of chances of its receiving and holding some of the pollen of its species.

MEANS OF DISTRIBUTING POLLEN. I. BY MEANS OF INSECTS.

What are the means for distributing the pollen grains from one flower to another. It may seem unnecessary for any special device to be provided by the plant, save possibly in flowers that are not perfect. Linnæus put forth the view that most flowers were perfect (i. e., with perfect stamens and pistils) because of the ease and certainty of pollination and subsequent fertilization. This logic seems rational, but if we look throughout nature it is apparent that the best life comes not from the union of the same blood or stock (self-fertilization) but by a "crossing" with individuals of another blood or stock (cross-fertilization). Carl Conrad Sprengel (in his work "Das Entdeckte Geheimniss der Natur im Baue und in der Befruchtung der Blumen," Berlin, 1793) was the first author that attempted to see some motive in the peculiar colors, nectar and odors of flowers. Sprengel observed that the drops of nectar in the lower portions of the petals of *Geranium silvaticum* were protected by a few inconspicuous hairs which he believed to be designed that insects might obtain this nectar. He later studied the Forget-me-not (*Myosotis palustris*) and observed that the yellow ring around the mouth of blue corolla must be intended as a guide to the insect to the nectar. He further believed from his observations that the various markings or stripings on many flowers, as in Pansy, etc., were in the nature of signs, "nectar-guides" (Saft-mal, as he termed them) that were produced in the flower for the purpose of directing the insect to the particular portion of the flower where the nectar was produced.

Sprengel observed, too, that many flowers that produce nectar require the visits of insects in order to produce seed. But although his work of over 100 years ago is remarkable for its accuracy of description and drawings, still he did not go further than to observe that there was a relation between flower, insect and seed. He did not see that in the act of visitations to the flower by the insect fertilization was finally effected. It was left to Andrew Knight (1799) to go a step further and clear up the connection, and in doing so he established the law "that in no plant does self-fertilization take place for an unlimited number of generations."

A good many years afterwards (1837) Herbert said: "I am inclined to think that I have derived advantage, in taking a flower from which I wished to obtain seed, by impregnating it with the pollen from another individual of the same variety or species, or at least from another flower rather than its own." Gartner (1844) about seven years later recorded a similar experience to that of Herbert.

Nägeli about this time says: "It will be admitted that the flowers of the orchids present a multitude of curious structures, which a few years ago would have been considered as mere morphological differences without any special function; but they are now known to be of the highest importance for fertilization of the species through the aid of insects and have probably been gained through natural selection."

Charles Darwin (in his "Origin of Species," 1859) brought this whole subject to a focus. He emphasized the law of Knight as a general law of nature. He says: (loc. cit. Chapter IV, On Interbreeding of Individuals): "No organic being fertilizes itself for a perpetuity of generations, and a cross with another individual is occasionally—perhaps at very long intervals—indispensable." Sprengel some years before had observed that in many flowers self-fertilization is prevented by the relative position of the reproductive organs, or by their ripening at different times. Darwin confirmed these observations of Sprengel and showed that pollination was effected by insects. This might be illustrated in two of our common flowers.

(1) In the flowers of the common Plantain (*Plantago major*, L.) the flowers are arranged in spikes (inflorescence, therefore, of the Indefinite or Indeterminate Class). The pistil of the lower flowers matures first, and after the pistil withers the stamens are protruded (Fig. 103) and discharge their pollen. It is very evident that there is no way for the pollen of one flower to fall upon the stigma of another flower in the same inflorescence. Seed is produced in some other way, viz., by means of an insect that comes from an inflorescence in which some of the pistils are ready to be fertilized.

(2) In many of the cultivated Primroses (*Primula sinensis*) the flowers are of two kinds, as regards the position of the essential elements. In one the pistil is long (Fig. 104), whereas in the other it is short. (Fig. 105.)

In the flower, however, that has the long pistil the stamens are inserted about half way in the tube of the corolla, in position corresponding to the pistil in the flower with the long stamens. In the flower with the short pistil the anthers are situated at the throat of the corolla tube. We find, too, upon examining the pollen grains of the two flowers that they

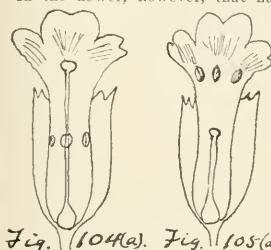
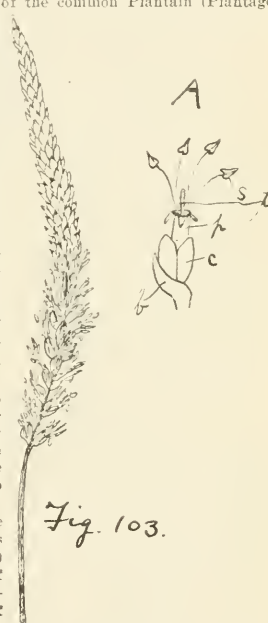


Fig. 103.—Spike of Flowers of Plantain (*Plantago major*), showing maturing of stamens below and of pistils above. (A) Flower dissected and showing its parts; (B) bract; (C) calyx; (D) corolla tube; (S) stamens; (T) projecting style. The flowers are protogynous, i. e., the style and stigma project first from the unopened corolla. The stamens are exerted only after the corolla has opened, and the style and stigma have withered.

are of different sizes. Those in

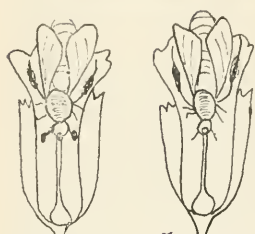


Fig. 104 (G). Fig. 105 (G)

surfaces of the stigmas of the two flowers. Figs. 104 (a), 104 (b), 105 (a), and 105 (b). Darwin later (in his work on Orchids) showed closely the necessity of cross-fertilization among these interesting and remarkable flowers.

Fritz Müller has found in certain orchids that they are not only sterile to their own pollen, but that the latter may even, in some cases, act as a fatal poison.

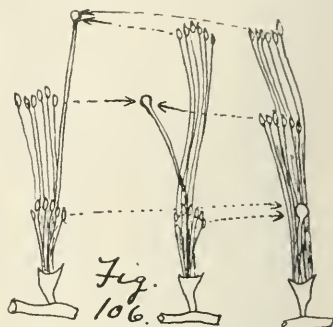
Darwin carried out numerous experiments which had for their object comparison of the products of self-fertilization and cross-fertilization.

In numerous plants which were found to be fertile with their own pollen, he fertilized some flowers with their own pollen and other flowers on the same plant with pollen from a neighboring plant growing under the same conditions; excluding insects with great precautions. He allowed the resulting seeds to germinate in damp sand and in the same vessels, and then planted them in pairs on opposite sides of the same flower pot. Then exercising all conceivable precautions to keep both sides under the same conditions, he watched the growth of the plants to maturity.

The same experiments of germination were repeated with the seeds produced by these and were continued from generation to generation. In some cases, as in Monkey Flower (*Mimulus luteus* L.), and one of the False Bindweeds (*Ipomoea purpurea*), the plants from cross-fertilization showed even in the first generation a marked superiority over the others. They were larger in the proportion of 4 to 3 or 3 to 2. They flowered earlier and produced more capsules. In other cases such superiority was less marked or was imperceptible, but in no single case was the advantage shown upon the side of self-fertilization being the better. Darwin continued these experiments for eleven years. He studied more than 1,000 plants in this manner. The results are embodied in that "Whenever plants which are the offspring of self-fertilization are opposed in the struggle for existence to the offspring of cross-fertilization, the latter have the advantage." Darwin continued his labors and explained what Sprengel had observed and described but the philosophy of which he did not comprehend. Sprengel had observed in one of the Primroses (*N. O. Primulaceae*) *Holtonia palustris*, that "some plants bear only flowers whose anthers are included within the tube of the corolla, but whose style is exserted, and others bear only flowers whose style is shorter and whose stamens are exserted beyond the tube of the corolla. I believe that this is not accidental, but that it is a disposition of nature, though I am not able to suggest its purpose." Darwin examined plants like *Holtonia*, viz., *Primula* (Fig. 104 and 105), *Flax* (*Linum*) etc., and explained the two

forms of flowers with styles and stamens of different lengths as being devices on the part of the plant to prevent self-fertilization, but encourage and provide for cross-fertilization.

Dimorphic Heterostyled Plants are such, as in *Primula* species, where there are two kinds of flowers with



styles and stamens of different lengths.

Trimorphic Heterostyled Plants are such, as in *Lythrum salicaria* (Fig. 106), where there are three kinds of flowers with styles and stamens of different lengths.

Legitimate Pollination or Fertilization.—It is apparent from a comparison of Figs. 104 and 105 that an insect that visits these dimorphic flowers will have the pollen discharged on two parts of its body. In the one case the pollen is taken up upon the head or fore portions of the body, and the other upon the hind portions of the body. In the former case it is deposited upon the stigma with a short style, and in the latter upon the one with a long style. This form of pollination is natural and proper, and was termed by Darwin Legitimate Fertilization, to distinguish it from that form in which the pollen grains from a stamen that did not correspond to the height of style, form of stigma, etc., of a pistil, were deposited thereon.

Darwin went to work and produced legitimate and illegitimate crossings of dimorphic and trimorphic flowers. He further took the seeds and allowed them to germinate. He then allowed them further to produce flowers, and again crossed them in various ways, and found as a result that only the legitimate crossings resulted in fertility and produced normal and fully fertile offspring, while, on the other hand, illegitimate crossings led to all degrees of diminished fertility, or even complete barrenness, and produced offspring which had all of the characters of bastards produced by the union of distinct species.

Since the opening of this subject on the means of which flowers are fertilized, many other authors, notably Hildebrand, Delpino, Müller, etc., have contributed greatly to our knowledge of the peculiar devices in the plant for the purpose of effecting fertilization.

II. DISTRIBUTION OF POLLEN BY MEANS OF WIND.

A word must be said regarding the distribution of pollen by means of the wind. In many of our early flowering trees, as well as in the Pines, Indian Corn, etc., we find that the flowers do not produce special attractions for insects, but that they produce large amounts of pollen which is discharged during dry weather, and carried by means of the wind to the pistil ready to receive it. The number of flowers that are fertilized by the wind is prob-

Figs. 104 and 105.—Flowers of one of the *Primulas*. In 104 (a) the style is long and the anthers are situated about midway in the corolla tube. In 105 (a) the style is short, and the anthers are situated at the mouth of the corolla tube. Figs. 104 (b) and 105 (b) show the entrance of two bees into a long-styled and short-styled flower, respectively. The bee in flower 104 (b) obtains the pollen on the fore part of its body which, when it enters flower 105 (b) will lodge on the stigma therein. The bee on flower 105 (b) secures the pollen on its legs and abdomen, and when it enters flower 104 (a) it will deposit the same there.

Fig. 106.—Dissection showing the essential elements of trimorphic heterostyled flowers of *Lythrum Salicaria*. The dotted lines with the arrows indicate the direction in which the pollen is carried from two of the flowers to the other one in order that fertilization be effected.

ably about one-tenth of all the flower-producing plants, and includes among these the following Natural orders: Cyperaceae, Juncaceae, Gramineae, Palmae, Juglandaceae, Cupuliferae, Conifers, etc.

Heliophlo has evolved a classification showing the varied measures employed by the plant and its adaptations for securing cross-fertilization. It is interesting in showing that water as well as wind, and that snails and "honey-sucking" birds as well as insects, play an important rôle.

I.—Hydrophilous Plants are those in which pollination is effected by means of water.

II.—Anemophilous Plants are those in which the wind is the active agent in effecting pollination.

III.—Zoidophilous Plants are those that require the agency of insects to convey the pollen to the stigma.

I.—Hydrophilous Plants are of two kinds: those that live under the water, as Pondweeds (species of *Potamogeton*, etc.), and those that produce their flowers near or at the surface of the water, as Eel-grass (*Vallesneria spiralis* L.). In the former case the pollen grains are necessarily of the same specific gravity as the water and are carried by the current very much as the wind is utilized by plants that live in the air. In the latter often the pollen grains are carried by the current, when they are necessarily of less specific gravity than the water; or the pollen is carried in the sepals which act as a kind of bract whose journey is between the stamens and stigmas of the dioecious flowers.

II.—Anemophilous Plants are characterized by possessing pollen grains that are smooth and easily scattered. The floral elements are not bright, nor is their nectar or odor produced by their flowers.

PRACTICAL STUDIES.

18.—Wild Carrot (*Daucus Carota* L.).—What is the inflorescence? Are all the flowers alike? Why are some neutral? Those that are fertile consist of how many sepals? Are they united with each other or any other elements? Of how many petals does each flower consist? Are the petals entire? Are they all of the same size? How many stamens are there? Do they show any adhesion or cohesion? Where is the disc? Is it hyogynous, perigynous or epigynous? How many ovaries are there? Is the number apparent from the appearance of the stigma? What is there peculiar about the shape of the inflorescence after fruiting has taken place? What is the name of the fruit? What is the shape of each mericarp? How many ribs are there? Are they smooth or prickly? Are there any secondary ribs? Give all reasons why carrot is such a weed. Observe (1) what developments are there in the flower to insure cross-fertilization, and (2) by what device the fruit is disseminated, and (3) seed is protected.

19.—Lavender Flowers.—Examine the commercial flowers. Select the better appearing flowers and soak in lukewarm water for several hours, or until soft and tender, and observe: Of how many parts does the calyx consist? Are they united or separate? If united, is the margin perfectly even? What is the color of the calyx? How many ribs are there, and are they smooth? The corolla consists of how many petals? Are they united or separate? If united, what is the form of the corolla? What is the color of the corolla? Separate the corolla, and by means of dissecting needles open the tube, spread it out and observe: the situation and number of stamens. The form of hair as well as color. What is their function? How many "cells" does the ovary consist of? Is there a style? What is the appearance of the stigma? Examine some of the pollen-grains by means of a compound microscope and observe shapes and markings. Observe if possible if there is any difference in the time of maturing of stamens and pistils. Give all of the means that may be observed in this flower for the insuring of cross-fertilization. Draw a diagram of the flower and state whether it is actinomorphic or zygomorphic, and if the latter, to what class it belongs.

20.—Composite Flowers.—Study flowers, preferably in the order given, if they can be procured: Sunflower, *Chrysanthemum*, Dandelion, *Arnica*, *Anthemis* and *Matricaria*. Observe the following points: The nature of the inflorescence? What are the green leaves which subtend the inflorescence? Are they alike in all? Make a long section through the flower head, and of one-half remove the florets and observe the receptacle as to form, and whether smooth, pitted, chaffy, etc.

Examine ray-flowers. Is the calyx developed to a pappus or not? If so, is it scale-like, scabrous, bristly, hair-like, etc. Note shape of corolla; length and color of corolla. Stamens may be present or absent. The question then arises—is the ray flower pistillate or perfect or neutral? If the pistil is present, the number of lobes of stigma and the position of the stigmatic surface must be ascertained.

If there are tubular flowers these are then to be examined after the manner of the ray-flowers. If they are perfect it will be interesting to observe the position of the anthers and their mode of discharge of pollen, and the arrangement of the stigmatic surface inside the tube of anthers. Also to note if there is any difference in the time of development of stamens and pistils. Further, how is self-fertilization prevented, and finally, how is self-fertilization insured in case cross-fertilization has not been effected. Observe the fruits as to size, color, markings. Further, see if any developments can be made out which might fit it for wide distribution and holding its own in the ground when once so disseminated. How is the double *chrysanthemum* produced? Is cultivation necessary to produce double flowers? What is the difference between the Roman and German chamomiles? Examine the pollen grains of all Composite flowers that may be examined and note any similarities or dissimilarities.

ACETYLENE GAS.

By H. INGLE, F. I. C.

Acetylene was discovered by Edmund Davy in 1836, and in 1894 Moissan, in France, and T. L. Willson, in South Carolina, as the result of independent research, discovered a ready and inexpensive method of obtaining calcium carbide by means of the electric furnace. This rendered the use of acetylene as an illuminant possible, for its preparation from calcium carbide, first noted by Wöhler in 1862, was a very simple and easy operation, consisting merely in treating the carbide with water, when acetylene was evolved very rapidly and slaked lime remained. In the operation great heat was evolved, and care is necessary in the preservation of calcium carbide, for contact with water may not only generate the extremely inflammable acetylene, but may also, under certain circumstances, cause its ignition when mixed with air. Explosions may arise in two ways. The combustible material may be mixed with some substance rich in oxygen and ready to part with that oxygen. In such a case a rise of temperature of a certain portion of the mixture may determine the rapid firing of the whole mass, with the production of great heat and great expansion. To this class belong the explosions of a mixture of coal-gas and air.

Acetylene, like all combustible gases, is liable to explosion in this way, and the limits of the proportion of acetylene and air which will thus explode are very widely separated. Such a mixture may be fired at a lower temperature than is requisite in the case of a mixture of coal gas and air. A chemical compound may tend to split up into other compounds that will explode without admixture with air or other substances. To this class belong gun-cotton, nitro-glycerin, etc., whose explosive detonation may be induced by a shock. It has been shown that acetylene, if compressed by more than two atmospheres pressure, is liable to such explosive decom-

position. Hence the extra danger in using liquefied acetylene. Indeed, almost all the serious acetylene accidents have been caused by the use of compressed acetylene. The employment of liquefied or compressed acetylene is to be condemned, unless used in the state of solution in acetone, a method of using the gas which recent experiments seem to show is much less dangerous than when the acetylene is compressed alone. In association with acetone, acetylene may with safety be subjected to a pressure of ten atmospheres.

The allegation that acetylene is poisonous seems to have been clearly disproved. In large quantities, like every other gas than air, it is poisonous, but may be breathed without serious effects. Acetylene must be supplied at much greater pressure than coal gas, and for that reason there is a risk in supplying it to a house containing ordinary gas fittings, as a weak spot, which would resist the pressure of coal gas, might not be able to resist the higher pressure of the other. In no case should copper be used in fittings brought into contact with acetylene in any form. Owing to the cost of production, it will be long before acetylene becomes a serious rival to coal gas in large installations, but in small installations, and in districts where the latter is not obtainable, acetylene has many claims for consideration. Its flame has fifteen times the illuminating power of a jet of coal gas, its candle power being from 200 to 240, and similar jets will burn 1 cubic foot of acetylene and 5 or 6 feet of coal gas in the same time.—(Pharm. Jour.)

PHARMACY.

DANDRUFF.—A writer in Texas Medical News says that the best local treatment consists of the proper cleansing of the scalp and the stimulation of the sebaceous glands to healthy action. The tincture of green soap makes an admirable shampoo for the scalp, removing in a thorough manner the epithelial and sebaceous debris there present. The list of hair tonics is legion. The following may be recommended as extremely useful:

Resorcin	30 grains
Salicylic acid	1 fl. dram
Castor oil	6 fl. drams
Rectified spirit	1 fl. dram
Oil of bergamot	

Rub well into the scalp every night.

SOLUTION OF ALUMINUM ACETATE.—According to Lambotte, best prepared by a modification of the method of the French Codex, as follows:

(1) Crystallized lead acetate	50 parts
Distilled water	100 parts
(2) Potassium alum	33 parts
Sodium sulphate	6 parts
Distilled water	300 parts

Dissolve separately in a water bath, let the solutions cool to room temperature, mix, and let stand for two days, then filter. A solution thus prepared contained 3.93 gm. of aluminum acetate and 0.0316 gm. of lead sulphate in 100 cc.—(Jour. de Ph. d'Ann.)

—Year Book of Treatment.

PREPARATION OF ABSOLUTE ALCOHOL WITH CALCIUM CARBIDE.—If coarsely powdered calcium carbide is added to alcohol of 90 or 95 per cent., a violent reaction ensues, with the evolution of acetylene gas, which continues as long as water is present. Calcium carbide can therefore be used as a test for water in alcohol. To prepare absolute alcohol from alcohol of 90 to 95 per cent., one-fourth its weight of calcium carbide is gradually added and the mixture frequently shaken until evolution of gas ceases. It is then distilled, and in order to remove any acetylene present, redistilled after addition of a little anhydrous copper sulphate.—(Compt. Rend., through Apt. Ztg.)

GLOBULARIN AND GLOBULARETIN.—These two substances are obtained from Globularia alypum L. and have been examined by Mouson and Balestre as to their therapeutic value. Globularin is a bitter glucoside of the formula $C_{25}H_{41}O_{11}$. It resembles caffeine in physiological action, in that it diminishes the secretion of urine and stimulates the action of the heart and nervous system. Globularetin is a decomposition product of globularin, formed by the action of hot dilute acids upon the latter, sugar being split off at the same time. It is a purgative and in large doses causes irritation of the intestinal tract.—(Ph. Post.)

CHOLESTERIN AND BILIARY SALTS AS ANTIDOTES FOR SNAKE POISONS.—It has recently been shown that minute quantities of the gall of snakes or mammals are capable of neutralizing fatal doses of snake poison. C. Phisalix (Compt. Rend.) has further determined that cholesterol and the salts contained in gall possess an immunizing power against snake venom, but lose this power when they have been heated to 120° C. The action is not that of antitoxins. It is an interesting fact that cholesterol has this power notwithstanding its sparing solubility and feeble chemical affinities. This action is at present difficult to explain and appears to be the first example of a definite chemical compound behaving like a lymph.—(Ap. Ztg.)

GUAIACETIN IN TUBERCULOSIS.—As a remedy for tuberculosis, Dr. Koellner recommends guaiacetin, which is a compound analogous to guaiacol, the principal constituent of creosote. While most combinations of creosote, when given in large doses, exhibit a certain degree of toxicity, guaiacetin is claimed to be entirely non-toxic and susceptible of being taken without any disturbances. Dr. Koellner has tried it in a number of cases during four months, and with the exception of one death, which was due to other causes, he obtained very satisfactory results. It decreased fever and night sweats and considerably augmented the appetite. In no instance was there a change for worse, and in some cases he met with brilliant success.—(Drog. Ztg.)

A NEW TEST FOR SANTONIN.—Dissolve 0.01 to 0.02 gm. of santonin in 2 gm. of concentrated sulphuric acid and add by drops with shaking, 2 cc. of a 1 per cent. solution of cerium sulphate containing 2 per cent. of sulphuric acid. Cool the cherry-red mixture and add 8 cc. of water. A fine violet-red precipitate and small dark colored particles separate. Divide the entire mixture into three portions. To one add carbolic acid in excess and agitate, which causes the aqueous layer to become colorless, while the carbolic acid takes up the red color. Shake the second portion with ether, which will remain colorless. Shake the remaining portion with amyl alcohol, which assumes a light-brown color. Transfer the colored layer to a dry test-tube and add phosphorus trichloride. The mixture becomes violet and remains unchanged for some time.—(Ap. Ztg.)

GLAUCIUM AS A REMEDY FOR DIABETES.—The genus Glaucium of the family Papaveraceae occurs in the tropics in several species, which have acquired a reputation for medicinal value in various localities. In Germany only Glaucium luteum is found. A mixture of herbs, consisting partly of the herb and root of Glaucium luteum, is popularly used in northern Italy as a remedy for diabetes. The proximate principles of these plants, as regards alkaloids, resemble those of Chelidonium, Sanguinaria and Papaver, but they also contain the bitter principles Glaucopirin and Glaucin, besides other substances not yet isolated. The highly toxic Cholethrin appears to be present in the root only, while glaucin predominates in the herb. Dr. Marquann reports encouraging results with a fluid extract prepared from an herb mixture of the species obtainable. It was given

in doses of $\frac{1}{2}$ to 1 teaspoonful 3 times daily, with a mixed diet, including bread, potatoes, rice, milk, etc. The patient felt better after a few days of the treatment and increased in weight after four weeks, while the sugar varied within the previous limits. A mixed diet in connection with this treatment was also well borne by other patients.—(Südd. Ap. Ztg.)

REMEDIES FOR CORYZA:

(1) Menthol	1 part
Boric acid, powd.	10 parts
Roasted coffee, powd.	10 parts
(2) Boric acid	2.5 parts
Starch	15 parts
Cocaine	0.2 part
Tannic acid	1 part
Menthol	1 part
(3) Menthol	1 part
Iodoform	1 part
Sugar of milk	10 parts
Roasted coffee	10 parts
(4) Menthol	1 part
Dermatol	2 parts
Sugar of milk	6 parts
Starch	6 parts
(5) Menthol	1 part
Chloroform	10 parts
or, Menthol	1 part
Chloroform	5 parts
Alcohol	5 parts

A few drops of the liquid are rubbed in the hands and the menthol vapors drawn up into the nose.

(6) A piece of 5 per cent. iodoform gauze is formed into a roll of suitable size, inserted into the nostrils and allowed to remain two or three hours. This is repeated several times daily. Instead of iodoform gauze, a gauze prepared by spreading upon it the following mixture may be used:

Iodoform	1 gm.
Oil of fennel	5 drops
Carbolic acid	5 drops
Vaseline	30 gm.

(7) Place 3 gm. of powdered camphor into a pot containing $\frac{1}{2}$ liter of boiling water, cover it with an inverted funnel or paper cone with an opening at the apex, and inhale the vapors which rise, for ten minutes. Repeat three times daily.

(8) Pour a little corn whisky into the hollow of the hand and draw it up into the nose. The burning soon ceases, so that this may be repeated after a short time. The application of vaseline or cold cream prevents the nose from becoming sore. If ulcers form, Dr. Lang directs using an ointment made from equal parts of bismuth subnitrate and vaseline.—(Ap. Ztg.)

ARTIFICIAL FERTILIZERS FOR POT PLANTS.

—A plant, in order to thrive properly, must grow in a soil that furnishes the necessary inorganic matters as food; if these are not present, or present only in small quantity, the plant either dies, or grows scantily, or develops only certain portions of its structure. Thus, grain grows only small and undeveloped seeds, if the soil does not contain enough phosphoric acid. As regards the organic food, plants are less dependent on the soil, as this is derived directly or indirectly from the atmosphere. As plants vary in the kind of mineral matter required, and the available mineral constituents in the soil also differ greatly in different localities, it is often necessary for the proper development of certain plants, to add certain substances to supply the deficiency. Some plants require principally one kind, some another, as lime, silica, potash or salt. Experiments on vegetation have shown that a plant will thrive perfectly when the lacking substances are supplied in a suitable form, e. g., in the following combinations:

1. Calcium nitrate, Potassium nitrate, Potassium phosphate, Magnesium sulphate, Ferric phosphate, (Sodium chloride).	2. Calcium nitrate, Ammonium nitrate, Potassium sulphate, Magnesium phosphate, Iron chloride (or sulphate), (Sodium silicate).
---	---

It is well known that in nature nitrates are formed wherever decomposition of organic nitrogenous substances takes place in the air, the ammonia formed by the decomposition being oxidized to nitric acid. These conditions for the formation of nitrates are present in nearly every cornfield and they are also the cause of the presence of nitrates in water that has its source near stables, etc. In Peruvian guano nitrogen is present partly in form of potassium nitrate, partly as ammonium phosphate and sulphate. In form of nitrate it acts more rapidly than in form of ammonia, but in the latter case the effect is more lasting. Phosphoric acid occurs in guano combined with ammonia, potash and chiefly with lime, the last being slower and more lasting in action than the others. These results of chemical experiment are the basis of a flourishing industry, the manufacture of artificial fertilizers, but also the flower lover has entered the field on a small scale, and many preparations under various names have been placed on the market, nearly all of which conform more or less to one of the above mentioned general formulas and can be ready prepared and sold advantageously by the pharmacist.

Artificial flower fertilizer:

	1.	2.	3.
Ammonium nitrate	0.40	1.60	40.0 Gm.
Ammonium phosphate	0.20	0.80	20.0 "
Potassium nitrate	0.25	1.00	25.0 "
Ammonium chloride	0.05	0.20	5.0 "
Calcium sulphate	0.06	0.24	6.0 "
Ferrous sulphate	0.04	0.16	4.0 "
	1.00	4.00	100.0 Gm.

Dissolve 1 Gm. in 1 liter of water and water the flowers with it 2 or 3 times weekly. Dissolve 4 Gm. in 1 liter of water and water with this quantity 10 or 12 pots of medium size.

Compost for indoor plants:

	1.	2.	3.
Ammonium sulphate	0.30	1.20	30.0 Gm.
Sodium chloride	0.30	1.20	30.0 "
Potassium nitrate	0.15	0.60	15.0 "
Magnesium sulphate	0.15	0.60	15.0 "
Magnesium phosphate	0.04	0.20	4.0 "
Sodium phosphate	0.06	0.24	6.0 "
	1.00	4.00	100.0 Gm.

1 Gm. to be dissolved in 1 liter of water and the flowers watered up to 3 times daily. Dissolve 4 Gm. in 1 liter of water and water with this solution daily:

Plant food solution:

	1.	2.
Potassium chloride	0.16	or 12.5 Gm.
Calcium nitrate	0.71	or 58.0 "
Magnesium sulphate	0.125	or 12.0 "
Potassium phosphate	0.133	or 13.0 "
Iron phosphate, recently precipitated	0.032	or 2.5 "
	1.160	or 100.0 Gm.

This turbid mixture (1.16 or 1.0 Gm. in 1 liter) is used alternately with water for watering a pot of about 1 liter capacity; for smaller or larger pots in proportion. After using the amount indicated, the watering is continued with water alone.

Fertilizer with organic matter, for pot flowers:

Potassium nitrate, Amm. phosphate	100.0 Gm.
Phosphoric acid	2.5 Gm.
Simple syrup	1 liter

Add not more than 10 cm. to a liter of water and water alternately with this and with water alone. For Cactaceæ Crassulaceæ and similar plants, which do not assimilate organic matter directly, use distilled water instead of syrup.

Chlorotic plants are painted with a dilute iron solution or iron is added to the soil, which causes them to assume their natural green color. The iron is used in form of ferric chloride or ferrous sulphate. (Pruys in Ph. Ztg.), through Ph. Rundschau.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Unanswered Queries.

H. C. Knill, Jr., Port Huron, Mich.; J. S. Wood & Co., Collinwood, O.; J. J. Dunning, M. D., McAlester, Ind. Ter., and others. This department is maintained exclusively for the use of subscribers. The demands upon our time forbid any other arrangement. This explains why your queries are unanswered.

Formula Wanted.

(E. M. W.) New method ink.

Registration in Indiana.

(L. B. H.) Indiana has no pharmacy law and anyone may engage in the drug business without registration.

Coating For Bungs or Stoppers For Casks.

(W. L. B.) Bungs may be rendered impervious by coating them with melted paraffin. An application of liquid waterglass has also been recommended.

Alvinine Suppositories.

(W.X.) These suppositories are stated by the manufacturer to contain "glycerin, sulphur, nux, henbane, extract witch hazel." We cannot give the working formula.

Elisir Maltopepsine.

(F. R. D.) We cannot give the working formula for this specialty. The manufacturers state that the "elixir" contains "10 grains of maltopepsine to each fluid dram." The formula for maltopepsine is given as follows:

Sugar of milk	35 ounces
Nutritives of grain	10 ounces
Dioscorein	7 ounces
Pepsin	10 ounces
Diastase	6 grams
Lactic acid	8 fl. drams
Hydrochloric acid	5 fl. drams
Phosphoric acid	3 fl. drams
Aluminium	3 ounces

White Ink.

(G. E. B.) White ink is made by suspending some insoluble substance in a liquid and applying with a brush or pen. In this way zinc oxide (Chinese white) may be ground very fine on a slab with a little mucilage of tragacanth or some other suitable adhesive and then thinned to the proper consistency. The mixture requires frequent agitation to keep the pigment from separating. The ink may be preserved by adding a little oil of cloves, carbolic acid or other antiseptic.

For a stamping liquid the following has been recommended: Dissolve 1 dram each of rosin and copal in 4 fluid ounces of benzene and with a little of this liquid triturate $\frac{1}{2}$ dram of some white pigment, zinc oxide, white lead, barytes, bismuth nitrate, etc.

Books on Compounding and Blending of Liquors.

(E. E. B.) There are a great number of books on the manufacture and distillation of liquors which contain considerable information upon compounding and blending liquors. This information is rarely enough, however, to supply the novice with a full understanding of the subject. Successful results as in other branches of business depend in a great measure upon tact and skill, a certain amount of practical experience and a thorough knowledge of the composition of alcoholic products. Duplais, "Treatise on the Manufacture and Distillation

of Alcoholic Liquors," \$10, contains very complete details of the whole subject. Other works are Fleischman "The Art of Blending and Compounding Liquors and Wines," \$2; Gardner, "Brewer, Distiller, and Wine Manufacturer," \$1.75; Monzert, "Practical Distiller," \$3.

Oil For Floors.

(P. & O.) We cannot give the formula for the proprietary article. Some one of the following may answer your purpose:

(1) Neatsfoot oil	1 part
Cottonseed oil	1 part
Petroleum oil	1 part
(2) Beeswax	8 parts
Water	50 parts
Potassium carbonate	4 parts

Dissolve the potash in 12 parts of water; heat together the wax and the remaining water till the wax is liquefied; then mix the two and boil together until a perfect emulsion is effected. Color, if desired, with solution of annatto.

(3) Some time ago a writer in a contemporary proposed a formula for an emulsion containing paraffin oil, 8 parts; kerosene, 1 part; lime water, 1 part. A coat of the mixture is applied to the floor with a mop.

Clay In Hectograph Masses.

(B. F. K.) White clay or kaolin is sometimes added to hectograph mixtures to make the resulting mass of the right consistency, free from bubbles and one which is not sticky. Instead of clay, sometimes other insoluble powders are employed, as chalk, sulphur, barium sulphate, etc. Here are three formulas, though others may be found by consulting previous volumes of the Era:

(1) Gelatin	4 ounces
Water	15 fl. ounces
Glycerin	15 fl. ounces
White clay (kaolin)	2 ounces
(2) Good ordinary glue	10 ounces
Glycerin	4 ounces
Kaolin or barium sulphate	2½ ounces
Water, sufficient	
(3) For a tin dish 7 x 11 inches:	
Glue	3 ounces
Glycerin	15 ounces
Kaolin	¾ ounce
Water	11¼ ounces

A Polyglot Formula.

(C. S. W. D.) received the following formula clipped from a newspaper. He wants it interpreted:

Cire blanche	16 parts
Esperma de ballena	8 parts
Mandelöl	28 parts
Adeps lane hydrosus	24 parts
Salben	28 parts
Borsaeus natron	1 part
Aqua destillata	36 parts
Oil orris (concrete Chiris)	4 parts

This formula is evidently intended for the preparation of a cold cream, the names of the various substances being somewhat obscured under the jumble of French, Spanish, German, Latin and English synonyms. However the formula may be interpreted:

White wax	16 parts
Spermaceti	8 parts
Expressed oil of almond	28 parts
Hydrous wool fat	24 parts
Ointment (?)	28 parts
Sodium borate	1 part
Distilled water	36 parts
Concrete oil orris (Chiris)	4 parts

Just what is wanted for "salben" (ointments) is not quite clear, though probably any simple ointment will answer the purpose.

Morphine and Atropine Combinations.

(R.W.) Potter says that morphine and atropine are sufficiently antagonistic to each other to make their combination extremely valuable as a therapeutic measure, and their use as mutual antidotes in poisoning by either a most efficient procedure if employed with due precautions. He says that when morphine is given as a hyp-

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, FEBRUARY 17, 1898.

No. 7.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York.
By D. O. HAYNES & Co.

Subscription Rates: U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483, NEW YORK.
Cable Address: "ERA"—New York.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

	PAGE		PAGE
EDITORIAL.....	241	Brooklyn Society Condemns	
CORRESPONDENCE.....	243	Shorter Hours.....	250
Old Mortars in Paris.....	243	Insurance for Druggists.....	250
Era Covers in Pharmacy.....	245	Carter Medicine Co.'s Suits.....	250
First Aid to the Injured.....	245	Granville Starts a Bank.....	261
Botany.....	248	John H. Maseh.....	261
Affairs Parisian and Pharm-		Pharmacists' Cigar Co.....	261
aceutical.....	252	Castoria Decision.....	262
Chinese Medicine and		Massachusetts Poison Law.....	265
Pharmacy.....	254	News Letters.....	266
Ernest Solvay.....	255	Business Record.....	273
PHARMACY.....	256	Associations, Boards and	
QUESTION BOX.....	258	Colleges.....	274
NEWS AND TRADE DEPART-		State of Trade.....	275
MENT.....	259	Market Reports.....	276
		PRICES CURRENT, in adv. pages	

"The British and Colonial Druggist," London.

Subscriptions and advertisements for this weekly drug journal will be received and forwarded through this office. Specimen copies and schedule of rates will be furnished upon application.

THE ERA DOSE BOOK.

Rapidity in prescription work is a recognized qualification in the dispenser, so much so that appliances and apparatus are continually sought for to facilitate speed. There is, however, another factor concerned in producing this desired result, viz., mental speed or quickness, and it also needs help in the way of labor-saving appliances. For instance, there are many things which cannot be trusted to memory without endangering accuracy, and the means for reference to these things should be just as handy and convenient as the other aids in dispensing. Nothing so well meets this requirement of mental speed in dispensing as the Era Dose Book. The most essential points in prescription work are condensed within it. The proper dosage of drugs and chemicals is indicated, and questions as to percentage, solubility, compatibility, dose equivalents, meanings of Latin, French and German terms, etc., etc., are answered at a glance. Whatever may be the other conveniences of the prescription department, there is need of a work of this kind and the Era Dose Book at 50 cents a copy supplies it most acceptably and economically.

The Castoria Decision.

A very great deal of interest is manifested in the Castoria case, as it is popularly called, and in view of this fact no excuse is necessary for publishing in this issue the full text of the decision of the U. S. Circuit Court of Appeals. Some vital principles of patent and trade-mark law, of right and justice and common sense, are involved and passed upon in this case, and it is well that the drug trade should have a clear understanding of them.

Everything must have a name. Just so soon as an article is discovered or produced it must be named, and the name thus given it becomes its common name, the property of the public, and is not a valid subject for a trade mark. Thus the name Castoria is held to be a common appellative, the name first given, and not entitled to trade-mark protection. This is sound law. But, farther than this, Castoria received letters patent from the government; the patent expired some years ago, and the present litigation is an effort to maintain and perpetuate through trade mark the protection it lost upon expiration of the patent. The owners of Castoria made the mistake of both patenting and trade-marking the article; they now lose the protection of both. A patent is protection for a term of years, in return for which full disclosure of method or product is made, to be free of use to the public, at expiration of the patent's life. A trade mark is properly only a means of identifying a certain brand or variety of the article itself. For proprietary medicines a trade mark is better protection than a patent; both together are no better than the patent alone.

Considering all these facts the decision in question seems sound and unassailable. We say nothing of the commercial aspects of the case, the moral rights of the originators of the medicine and their imitators; these are matters to be fought out by the interested parties, and every laborer is entitled to his reward. A better understanding of trade-mark and patent limitations would have prevented many of the absurdities and anomalies which now exist. The former custom of securing letters patent for proprietary medicines was long since abandoned by their owners, but the common law of trade marks prohibits any imitation of packages tending to deceive the buyer.

Department Stores.

Attempts have been made in various parts of the country to regulate by legislation the department store evil, but with very little success so far. The favorite proposition seems to be to impose a license tax, increasing in arithmetical progression with each additional line of business handled. The tax is small for a single line; but is double for two lines, this sum doubled for three lines, and so on, until but very little calculation is necessary to demonstrate that such a tax would be absolutely prohibitive if applied to a business covering a dozen or more lines. In all of the movements against these stores retail druggists have been actively interested. The latest is now in agitation in Kansas City, where a Single Line Merchants' Association has been organized. The title is sufficient indication of the line of work this association proposes to inaugurate, and the intention is to adopt every legitimate means, legislative or otherwise, to fight

against the department stores. There is nothing particularly new in this movement in Kansas City, but a rather novel feature was introduced through the statement of a druggist to the effect that as soon as the campaign was well under way he would go through his own store and rule out everything that did not properly belong to the drug trade. We shall be curious to learn what is left after this ruling out.

Liquor and Druggists.

The poor we always have with us; equally constant to the drug trade is the liquor question. The proper way to control the sale of liquor and just what are the druggists' moral as well as legal rights in the matter constitute a subject for perennial discussion. There is plenty of room for honest difference of opinion, but there are certain broad lines of right and wrong plainly discernible. We have no sympathy nor consideration for the druggist who deliberately and wilfully crosses the boundary from the former to the latter, but all sympathy for the honest-intentioned druggist who is hampered by all sorts of vexatious restrictions designed to prevent evil-doing by the disreputable. The innocent is made to suffer for the guilty.

In Iowa there has been, probably, more trouble with the liquor laws than in any other State. There are so many and such peculiar and onerous restrictions that druggists do not know "where they're at." Here is a little sample of what is continually being done in that State. Senator ——— has introduced into the Legislature a series of bills to reform the pharmacy laws against selling liquors. It seems that several druggists in his home town have been indicted for illegal sales, and have organized the druggists to repeal the obnoxious features of the law. The bills presented provide that it shall be discretionary with the pharmacy commissioners whether they will revoke a druggist's permit if he violates the law. At present the law is mandatory. They also leave the enforcement of certain other penalties in the discretion of the court which are now mandatory.

These measures, from this description, seem to be in the druggists' interests, but what a commentary upon the state of affairs in this land of liberty and equal rights that reputable business men must be watched like a lot of thieves.

Neither Christian Nor Science.

The methods of Christian Scientists are coming in for pretty heavy scoring by the newspapers recently, and not a few of the law's officials condemn the practices which are often found detrimental and fatal to the sick. One New York paper speaks of "the wilful infliction of death upon scores of human beings, and the endangering of whole communities, by votaries of this abhorrent cult. Helpless children suffering from diphtheria are allowed to suffocate while reckless fanatics crowd around with mumbled spells, and contagion is scattered broadcast through the neglect of the exorcisers to take the simplest measures of precaution. . . . After a while, perhaps, drugs will become unnecessary; but it will be some centuries hence. In the meantime the place for 'Christian Scientists' who do murder in the name of their 'science' is in jail or on the scaffold, as the case may be."

Antitoxin Manufacture by Health Boards.

There is very much of discussion just at present in this city and in the State, caused by a bill introduced into the Legislature, whose purpose is to substitute new health laws for those now provided for in the charter of Greater New York, and making several changes in the sanitary clause. The most fruitful theme of discussion is afforded by that portion of the bill which concerns the manufacture and sale of antitoxin by the New York City Board of Health. Opinions are divided upon this point, though the majority of the medical profession are op-

posed to the city operating a medicine factory of this sort. We had some words to say upon this question very recently. It is the city's privilege and duty, through its health board, to carefully watch over the quality of the antitoxin used in the treatment of its public charges, but it is entirely illegitimate to go into the drug manufacturing business, and to make a profit therefrom. Private enterprise and ordinary business competition can well be depended upon to furnish a good article, when it is assured that a standard will be rigidly maintained by the health officials, and beside all this, the business naturally belongs to private manufacturers, not to a municipality.

Moving Advertising.

The United States is often reproached for being so oblivious to aesthetic considerations that it permits, and even obviously encourages, the defacement of its natural scenic beauties by the patent medicine and other advertisements which are painted upon every prominent point of rock, mountain, and on structures of man's own erection. The reproach is well merited. The advertising art (we call it an art because every one else does), has reached a high degree of development in this country, as is witnessed by the elaborate and gorgeous billboards in our cities and the extensive and expensive signs erected along the pathways of the great railroads, to say nothing of the startling displays in color and syntax which greet our eyes in every public conveyance. But at last we seem to have come to the very utmost highest limit of this sort of thing, and have been startled by reading in the newspapers the past week of a project, for which success is predicted, to increase the revenue of the railroads, and at the same time educate the people along their rights of way, by painting all kinds of advertisements on the sides of freight cars. Just think of what is contained in this idea! A veritable art gallery of commerce perambulating in all directions across this wide land. The idea is capable of infinite variety and extension, and we are appalled by its magnitude and importance.

We all know what great trouble has been caused in Denver by the operations of the department stores, and particularly to the drug trade. The druggists there suffer also from stabs in the back by members of their own calling. The cutter is denounced by the trade he injures, but, and it is a sad commentary upon human nature, public sympathy is always with him. Newspapers in particular call down blessings upon the cutter as a benefactor of the human race, particularly of the poor. It is therefore not only extremely surprising, but very refreshing, to see in a Denver newspaper these words concerning a firm of cutting druggists in that city: "The ——— Drug Company are cutting as if they intended to ruin the business entirely, and themselves at the same time. The idiotic course they are pursuing in trying to sell ——— for ——— cents is amusing, and it is also amusing to see how the public bite at such schemes. The public ought to be aware that rent, clerk hire and goods cost money and have to be paid for."

A man entered a drug store and inquired for Hunyadi Water; he received what he supposed was this beverage and drank a glassful of it. Internal agitation notified him that there was undoubtedly some mistake in the character of the article supplied, and a little investigation showed that he had imbibed wood alcohol, which the clerk in the store had been using to clean the show cases, and which was contained in a bottle exactly like the one containing the Hunyadi Water. Fortunately, prompt medical treatment saved the life of the customer. This incident happened in an Indiana store, whose proprietor is a woman. So much has been said about the practice of pharmacy in Indiana, a State which has no pharmacy law, and pro and con the woman in pharmacy, that we prefer not to deduce any moral from this little tale; this is left to the reader to do for himself.

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

FEELS SORRY FOR THE CUTTER.

THE ECONOMICAL DRUG COMPANY.

No. 84 State Street,

C. H. McConnell, Prest. and Mgr.

Thos. M. McDrum, Treas. Chicago, Feb. 11, 1898.

To the Editor.

It was the refinement of cruelty to publish in your issue of Feb. 3, without comment of any kind, a notice of the failure of that "notorious cutter," Paul V. Finch, of Grand Rapids, Mich., together with a list of his creditors.

I sincerely sympathize with poor Finch, or any other unfortunate business man, and my sympathy is all the deeper because I have not been free from business misfortunes myself.

But the thing that shocked me in reading this list of creditors was to discover that some twenty-two very virtuous firms of wholesale druggists and patent medicine manufacturers, who would under no circumstances sell the Economical Drug Co., had been caught for greater or less amounts (mostly greater), in the failure of this "cutter," who demoralized the drug trade of Grand Rapids even more than I am accused of having demoralized the drug trade of Chicago.

I am especially pained at noticing in that list the names of some local houses which have uniformly refused to sell me because I was a "cutter." The moral of this publication is that it is dangerous to sell to "cutters," in case the "cutter" fails. My friend Kline can appreciate the force of this observation.

In the sweet bye-and-bye we may hope that the wholesale drug trade and the patent medicine manufacturers will do business on business principles and sell to merchants of good repute, without concern as to the prices at which the retailers sell goods, the same as in nearly all lines of business except the drug business. Respectfully yours,

C. H. McCONNELL.

OBJECTS TO STAMP SELLING.

To the Editor.

New York, Feb. 6, 1898.

I wish to join hands and feet with the druggist in Pittsburgh and protest and kick together with him against the evil of selling postage stamps in the drug store. Though I myself comparatively sell quite a limited number of stamps or postal cards, I cannot see any necessity of selling even one a day; I protest even against that. Anything in the way of accommodation is well and good. But as I, and all of us, notice, it is no more an accommodation, it becomes a necessity for us. We surmise that we lose a customer and his trade if we refuse to sell him a stamp. But I can and wish to assure my colleagues, that as far as at least as my experience goes it is a grave mistake, and of course we alone are to blame for it; the public are not to blame at all. The public in general take what they get. But let me assure you that when you have the confidence of your customers as a *druggist*, they will come to you for their drugs and prescriptions, even after you have refused them stamps ten, fifteen or twenty times. I could prove my assertion. It is indeed high time for us to look into this matter and explain to ourselves, that even such an accommodation, or rather such an important duty, as selling a postal card should not be requested of you while you weigh 0.01 of morphine or anything else. Let us take this up and discuss it at length, colleagues. Yours very truly,

M. D. MISLIG.

OLD MORTARS IN PARIS.

A PHARMACIST'S MUSEUM.—A MORTAR WORTH \$3,000.

(With sketches made especially for the Era.)

The Parisian public museums contain comparatively few specimens of ancient mortars, though the Cluny Museum is worth a visit.

Far more interesting and complete is the series which figures in the window of M. Hendier's pharmacy, rue de Courcelles and boulevard de Courcelles. The collection of pharmaceutical and other curios has long been his favorite hobby, and all around the cornice of the pharmacy are quaint old drug pots, while oak carvings, pharmacy spoons, an auto-da-fé bell, and other objects are disposed in odd corners. But mortars are his particular passion, and taking it all round—for variety, size and beauty—his collection of these would be hard to equal.

The most ancient is probably the tiny utensil which M. Hendier supposes to be Persian or Arab, remarking that it was these Oriental peoples who introduced pharmacy into Europe by Spain and Italy. Our first illustration



Fig. 1.—A. D. 1536.

shows the oldest, bearing a date. Adorned with a central band of flowers, the rim bears the inscription in quaint Gothic letters, "PETER TANDEN GHEIN ME FECIT MCCCCXXXVI" (1536). The handles are in the form of ram's heads.

There are quite a large number of Henry II. mortars, which date from the French Renaissance of the sixteenth century, and usually bear portraits, which M. Hendier identifies as Francis I., Daina of Poitiers, Leonard de Vinci, and other celebrities of the epoch. One individual bears a falcon on his wrist; elsewhere the royal crown and fleur-de-lys may be observed.

The finest specimen of this style is shown in Fig. 2, which stands in the place of honor in the center of the pharmacy, and is one of the four large mortars in which their owner takes especial pride. A foot high and 18 inches in diameter, it weighs about 2 cwt. with the pestle, and rings as true as a bell when a blow is struck. It is probably worth \$400. The upper part bears the religious emblems (Crucifixion, J. M., etc.) interspersed with portraits of the omnipresent Diana and others, while the lower half presents the floral decoration of the Italian Renaissance.

But to return to the smaller mortars, one dated 1596 is probably Dutch; it is in brass with the usual flat two-ended pestle, and a plain bronze German mortar with dolphin handles was made in 1606. In brass again is

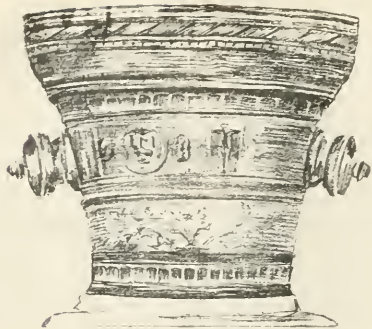


Fig. 2.—The "100 Kilos."

the mortar with Renaissance ornaments, inscribed "SOLI DEO GLORIA, 1632;" it has ornamented loop handles and a T-handled pestle. Another in bronze bears the same pious device.

M. Heudier pointed out the high and narrow shape which usually distinguishes the old German mortars in a plain, nicked specimen, and also in another bearing the not uncommon motto, "AMOR VINCIT OMNIA, 1701." The lower, wider shape favored by French makers, on the other hand, may be noticed in Fig. 3, as well as in others bearing inscriptions "Urbain Hudault, Sergent Royal, 1686," and (in French also) "I was made for St. Mederic's Charity in the year 1725."



Fig. 3.—The "Sow."

Very original is the inscription on the large French mortar shown in Fig. 3, "I resemble a sow for bulk." ("Je ressemble a une truye p. l. m.") St. Peter, the Virgin, etc., figure below, and it is dated 1625.



Fig. 5.—The "Caryatid" Mortar.

Equally large and of similar shape is the huge bronze, "Made in 1643 for Estienne Pol," by Simon Jacobus.

The handsome and massive mortar shown in Fig. 5 is dated 1770, and is somewhat in the Louis XV. style of art. The caryatids forming the handles present an odd combination of angel wings and the hairy nether limbs of satyrs.

The peculiar pestle (Fig. 4) represents St. Michael overthrowing the evil one. The saint's head-dress, although suspiciously like a harlequin's cap, is doubtless intended by the pious artist to represent an episcopal mitre.

A \$3,000 MORTAR

is to be found in the private collection of M. Martin Le Roy, a rich amateur who is connected with the legal



Fig. 4.—"St. Michael" Pestle.

profession. It adorns the main staircase of his handsome private residence in the rue Rembrandt, where the writer inspected it by his permission. Its large size and highly artistic and original design explain the price paid for it by its present owner, who believes it to have been made about A. D. 1500 for some Italian prince who pursued the then popular and honored study of alchemy. It came from the neighborhood of Padua, and was cast by the process known as "cire perdue." The vine which adorns the upper part seems to have been cast from the actual fruit, the acanthus at the base is more formal, but equally remarkable. There is no inscription, nor is there a pestle; it somewhat resembles a flower vase in shape; but both its owner and M. Heudier consider it a genuine relic of bygone pharmacy.

RAISING A WRECK WITH MAGNETS.—"Apropos of magnets for lifting purposes," says Cassier's Magazine, (Lit. Digest), "it is interesting to note that some one has suggested their application to the raising of iron and steel vessels sunk in deep water—too deep to admit of the employment of divers. One proposed scheme has for its object the raising of the ill-fated Victoria, of the British navy, which now lies at the bottom of the Mediterranean, in 450 feet of water, off the harbor of Tripoli. The weight of the wreck in water is estimated at 7,000 tons, and the suggested method of raising it is as follows: Powerful hydraulic rams and dynamo machines, and a series of heavy electromagnets are to be arranged on pontoons at the scene of the wreck. A magnet, lowered over the side and coming within reasonable distance of the sunken vessel, would be drawn toward the latter, and, on touching any iron or steel part of it, would immediately stick to it with a power of 100 tons. As each magnet made attachment, which would be indicated by means of an electric dial on the pontoon, a trial pull would be given to the rope to ascertain that a connection had been made to a firm part of the wreck. Should this not be the case the magnet would come off; its position would be then slightly moved and a fresh attachment made until a firm hold had been taken of the wreck. When all the magnets had been thus fixed, the wreck would be considered ready for raising. * * * All this is, at present, simply in the nature of a suggestion, more interesting probably than practically valuable, especially as the roughly estimated cost of its execution runs up close to the £100,000 mark."

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D.,
Ph.G.
Virgil Coblentz, A.M., Ph.M.,
Ph.D., F.C.S.
Albert E. Ebert, Ph.M.,
Ph.D.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D.,
Ph.D., Ph.C.
Charles F. Heebner, Phm.B.,
Ph.G.
George B. Kauffman, B.Sc.,
Phar.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G.,
Ph.D.
Edward Kremers, Ph.G.,
Ph.D.

John Uri Lloyd, Ph.M., Ph.D.
Oscar Oldberg, Phar.D.
Charles W. Parsons, Ph.C.
Edgar L. Patch, Ph.G.
George F. Payne, Ph.G.,
M.D.
T. D. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M.,
M.D.
Henry H. Rusby, M.D.
L. E. Sayre, B.S., Ph.M.
Wilbur L. Scoville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in **THE PHARMACEUTICAL ERA**, and the **QUIZZES** and **EXAMINATIONS** are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and **DIPLOMAS** are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed. **FEES.** The entire expense is only \$7.75 per annum and includes subscription to the *ERA*, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 45.

First Aids to the Injured.

By STEWART LEROY McCURDY, A.M., M.D.

Professor of Anatomy and Oral Surgery, Pittsburg Dental College;

Dean of Pittsburg School of Anatomy; Orthopedic Surgeon to Presbyterian Hospital, Pittsburg, Etc.

PART II.

SPRAINS.

A Sprain is a partial dislocation, but where the bone again returns to its normal position. It may conveniently be divided into three degrees: (1st) Where there is no injury to the joint; (2d) where the joint-bag is torn and the synovial fluid escapes into the surrounding structures, associated with which there is more or less rupture of the ligaments of the joint, and (3d) where instead of rupture of the ligament it is torn from the bone and along with it is taken a bony insertion; this is known as a sprain-fracture. The treatment will be governed by the severity of the injury.

Those of the first variety require rest for a few days, with stimulating liniments.

In the second variety great care must be exercised, not only immediately after the accident, but for some weeks, with immobilization of the joint and absolute rest, or permanent disability may result, presenting a condition of chronic sprain.

In sprains, as in dislocations or lacerations of surface structures, the injured tissue must have time to repair, and this takes from two to six weeks. Great and immediate swelling is almost always found. This may be reduced by elevation of the extremity, massage, applications of cold, or in some cases heat, as may be most grateful to the patient. Cold, however, during the first few hours will be most acceptable and beneficial, and heat as an after-treatment.

Previous to the time when the patient is handed over to the surgeon the sprained joint may be placed in a bucket of cold water, or under running water for an hour, after which it may be wrapped in cotton or cloth saturated in witch hazel, vinegar, arnica, or soap liniment. The bandage should be applied quite loosely for fear of further swelling.

In Sprain Fractures the treatment, so far as first aids is, is the same as the second variety. When the fragment does not unite to the bone, as frequently happens, it

may occasionally get between the heads of the bones and for an instant cause great pain until disengaged. The operative treatment of such a condition lies within the province of the surgeon.

DISLOCATION.

A Dislocation is the displacement of one bone from another at its normal articulation. It is partial when some parts of the articular surfaces remain in contact, and complete when no parts of the articular surfaces touch or when the heads of the bones are carried past each other. Unless a joint has suffered frequent, or chronic, displacement, the ligaments of the joint or the synovial or joint bag are more or less torn. They are caused by falls, or some force applied in a direction to throw the heads apart. Deformity is always found unless swelling is so extensive as to interfere with a proper examination. The displacement may be confounded with fracture in or about the joint. Pain during the first few hours is not severe, since the force which produces the dislocation also injures the nerve supply to the joint, and destruction of sensation results.

Treatment is to restore the bones to a normal position, and this may be attempted by anyone, using only moderate force, for great force applied by those not acquainted with the anatomy of the parts may do serious injury to nerves and other structures. When reduction is not easily affected, the extremity should be placed in the most comfortable position and allowed to remain so until the surgeon takes charge. Locally stimulating and anodyne lotions should be applied about the joint.

In shoulder dislocations, which comprise more than one-half of all displacements, the humerus (arm bone) may be reduced by gently carrying the arm out from the body to almost right angle, with the forearm at right angle with the arm. While one is making gentle but firm traction, a second individual places the thumbs on the tip

of the shoulders and with the fingers under the displaced head of the bone in the arm pit, it may be lifted into position. Here the general rule must be observed, viz., do not use too much force for fear of doing injury.

In dislocation of the lower jaw the chin stands out and the mouth open. Reduction is accomplished by standing in front of your patient, place the thumbs, protected by a napkin, between the teeth well back in the angle of the mouth, and with the fingers under the chin they are drawn up. By a downward and backward pressure of the thumbs the bone as a rule slips into position.

Dislocation of the fingers may be reduced by making firm traction immediately after the accident. However, these displacements are found most difficult, and even the surgeon's skill and perseverance are tested.

Displacements at the hip, knee, ankle and foot require such treatment as may seem best in the individual case. An effort may be made at reduction, but the surgeon should be permitted to assume responsibility in difficult cases.

FRACTURE.

A Fracture is a sudden solution in the continuity of bone, and gives a history of injury.

There is found pain and swelling at the point, associated with an inability to use the member, and grating is, as a rule, perceived upon slight movements, caused by the broken ends of the bone rubbing against each other.

A fracture is simple when the skin is not ruptured, and compound when an opening is found through the skin down to the seat of the fracture. When compound fractures have strict antiseptic treatment from the date of the accident, they recover as simple ones, but are far more dangerous, because of the liability to infection and consequent suppuration.

In all cases of fracture, strip the injured member of clothing and apply the temporary support next to the skin, using cotton as a pad.

Fractures of the arm (above elbow). The bone should be made parallel with the side of the chest. Splints may be applied, which should be padded with cotton and extend from elbow to shoulder. Bandage should not be very tight, as extensive swelling is likely to occur and produce damage from pressure. The forearm is placed in an ordinary sling.

Fracture of bones of the forearm most usually follow falls, and occur most frequently near the wrist joint. Effort may be made at reduction by making traction upon the hand while the point of fracture is supported, and gentle pressure made upon the deformity. Much force should not be used, since the displacement for an hour or so, or until the arrival of the surgeon, does little damage.

Fractures of fingers and thumb require straightening, and slight traction to allow the ends of the bones to drop back into position when displacement is found. They are best held in position by palmar splints or pasteboard wrapped about the fingers and held there by a bandage.

Fracture of the ribs requires little from the layman except to apply a broad bandage, or towel, around the chest, making such tension as is most comfortable to the patient. Strips of adhesive plaster placed parallel with the ribs afford support and relief.

In fracture of the thigh the leg must be made parallel with its fellow and firm traction made upon the foot to place the bones in the most comfortable position. Red slats or other boards may be placed along the sides of the leg and held in position by a bandage. The thigh may be wrapped in a pillow or comforter, and held in position by three tapes, or the legs may be tied together.

Fracture of the knee cap requires complete extension of the leg, and is held in position by a long splint secured back of the knee.

Fracture of the bones of the leg requires supports

which may be secured by the usual side splints, or a very fair support is afforded by a pillow being wrapped about it and held in position by tapes.

Fracture of the bones of the foot and toes requires similar treatment to that given injuries of the hand, i. e., correct deformity, if it can be done by ordinary efforts, and support the foot by the use of splints.

Fractures of the spine or pelvis require absolute rest, with the patient lying down, and when these conditions are suspected, if an effort at moving the patient be made, the injured parts must have extra protection and support.

In fracture about or into a joint, care must be taken in moving a patient. The joint must be kept quiet as possible, and no great effort should be made to restore distortions, as damage is easily done.

In fracture of the collar bone a pad should be placed under the arm, which is then drawn forward with the elbow approximating the pit of the stomach. The hand is placed on the well shoulder. A sling is now placed under the tip of the elbow and the ends pinned over the hand on the well shoulder. Considerable traction should be made so as to throw the shoulder higher than its fellow. This bandage encircles the body.

In fractures of the jaw, the most that can be done is to support the chin with a four-tailed bandage or handkerchief until the case falls into the hands of the surgeon.

In compound fractures, the general rules for the treatment of wounds, viz., antiseptics or cleanliness, must be practiced in connection with the rules just given for the support of fractures.

As general suggestions for the management of fractures, temporary splints may be made of cigar box, boards, bed slats, pasteboard, leather, or anything that will afford supports. When contusions are present anodyne lotions may be applied under the supports.

HEMORRHAGE.

A hemorrhage is the escape of blood from the cavity of the blood vessels. It is internal or concealed when



Fig. 2.

it cannot be seen, and external when the flow is from an external wound.

Bright red blood comes from an artery, and usually escapes with an interrupted spurt. Dark red blood which escapes with a continuous flow is from a vein.

A schematic drawing of the circulation of blood is shown in Fig. 2. The black vessels represent the arter-

ies, which contain arterial blood. The white vessels represent the veins, and in them is found venous blood. The change in color takes place at two points: (1st) from dark red to bright red, or from venous to arterial, in the lungs, (a) where carbon dioxide gas is thrown off and oxygen is taken on; (2d) from bright red to dark red in the capillaries and veins, and is caused by giving off oxygen and taking up carbon dioxide gas. Nutrition is also delivered to the tissues through the capillaries, and it is possible that the latter process has also to do with the change in color of the blood.

The arrow point in the diagram (Fig. 2) represents the course of the blood current. From its venous you will learn that the blood flows from the right side of the heart to the lungs through the pulmonary artery, and from the lungs back to the left side of the heart through the pulmonary vein (here the artery carries venous blood and the vein arterial blood) from whence it goes through the aorta, then to the smaller arteries, and next into the capillaries, after which it enters the veins and returns to the right side of the heart whence it started.

The reason blood spurts interruptedly from an artery and flows continuously from a vein is that the principal force which propels the blood through the vessels is the muscular contraction of the heart, an interrupted force occurring about 72 times per minute. When the blood gets into the veins it has gone through the capillaries and the interrupted force from behind has expended itself and there is instead a continued force or pressure.

The reason one so readily bleeds to death from an artery and not from a vein is that there is nothing to interrupt the flow from the arteries, as they have no valves as have the veins where no backward flow of blood can occur.

The names of the various arteries and veins can be learned by studying Fig. 3, and the accompanying description table. Here, as in Fig. 2, the arteries are represented in black and the veins in white.

Control of External Hemorrhage.—The first principle in the control of hemorrhage from small cuts, lacerations, and especially those about the head and face is to make direct pressure upon or into the wound with a clean piece of gauze or cotton. When the vessel from which the blood is escaping is not too large, such pressure, if kept up for ten to fifteen minutes, will control it.

When a large blood vessel is severed with a knife, or where a limb is torn from the body and the patulous ends of the vessels are bleeding freely, pressure must be made *above* the point of hemorrhage. This may be done by making direct pressure upon the artery as indicated in Fig. 3, with the thumb, or the extremity may be girdled with a handkerchief or any kind of fabric tight enough to stop the flow. Such a tourniquet makes best pressure if a stone or other firm object is placed in the folds of the handkerchief and placed directly over the artery. A stick may be tied in the second knot on the opposite side of the leg from the vessel. By turning this sufficient pressure may be made to control the hemorrhage. See Fig. 3 (A, B, C, D, E, F, G).

The best means of controlling hemorrhage from an extremity is with a rubber tourniquet or band. One is placed in a medical or emergency box, and should be found wherever it may be of use, and indeed every druggist should have one in his store, as they may be secured for a trifle. They are always ready, are easily applied by anyone, and are always effective. Damage may be done with them if they are applied too tightly and allowed to remain on too long, and this is a precaution which must be considered.

In making application of any variety of tourniquet, care must be taken to apply it tight enough to control the flow and not any tighter.

To recapitulate, hemorrhage is controlled about the head and face, and when not very alarming, as from small cuts and lacerations, by direct pressure into the

wound, and in free hemorrhage, by direct pressure with the thumb or other hard object upon the artery, or with a tourniquet.

HEMORRHAGIC DIATHESIS.

Hemorrhage from individuals who are known as "bleeders" is most alarming, and the ordinary methods used for the control of hemorrhage amounts to little, and indeed no rules are known to stop the flow of blood in all cases, or even in the same individual at different times. This condition is known as the "Hemorrhagic Diathesis." It is a peculiar fact that it is found in successive generations, and is usually in women. Hemorrhage is frequently so alarming as to almost completely deprive the patient of blood, and the flow only stops when the patient faints, or the patient may die.

The treatment consists in elevating the parts from which the flow is occurring. Make application of astringents, as Monsel's solution and tannic acid. Direct pressure with the finger kept up for hours may act as well. The doctor should assume responsibility.

INTERNAL HEMORRHAGE.

Hemorrhage may occur from the cavities of the body.

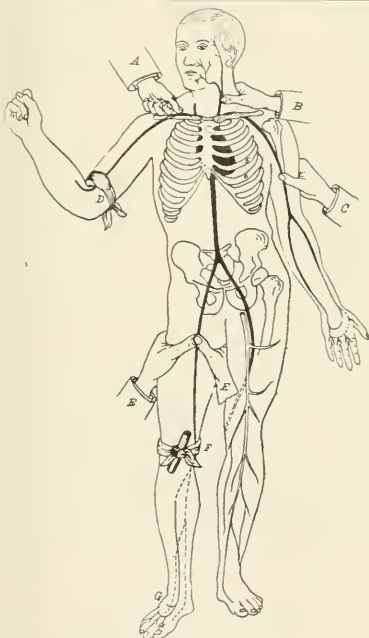


Fig. 3.

Plate showing arterial circulation, the thumb resting on the blood vessels at points where pressure is best made to control hemorrhage.

A.—Subclavian artery; press thumb directly down on the first rib back of the collar bone, to control hemorrhage from the upper extremity.

B.—Carotid artery; press thumb directly inward and backward, to control hemorrhage from the head or face.

C.—Brachial artery; press thumb from inside of arm directly against the bone, to control hemorrhage from the elbow, forearm or hand.

D.—Tourniquet made of a handkerchief with a hard object resting in bend of elbow over the artery, with a knot on the back part of the arm.

E.—Femoral artery; press thumbs against the anterior internal aspect of the thigh, to control hemorrhage from the thigh or leg below this point.

F.—Tourniquet to control hemorrhage from leg. Stick through the knot which may be twisted until flow stops.

G.—Dorsalis pedis artery; pressure is made with the thumb on top of foot.

as the mouth, nose, stomach, lungs, intestines, or from the uterus.

Nasal hemorrhage is the most frequent variety and is usually from the mucous membrane of the anterior or superior portion of the nasal cavity.

The more alarming hemorrhage occurs from the roof of the cavity, well back.

Ordinary hemorrhage from the anterior surface may be controlled by making pressure against the side of the nose with the thumb, or by the application of cold cloths to the back of the neck with the body in an upright position. Astringent douches may be injected up the nose with benefit, but care must be taken not to damage the nasal mucous membrane with the douche tip.

The packing of the cavity with gauze or plugging the anterior and posterior nares must be left to the physician. Nasal hemorrhage is a symptom of typhoid fever.

Hemorrhage from the mouth after the extraction of a tooth is not an infrequent complication. It may be controlled usually by first cleansing the tooth socket, swabbing with Monsel's solution, and afterwards packing it with gauze or cotton.

Hemorrhage in the stomach is only made manifest

when the blood is vomited and then it may be mixed with the food and be difficult to recognize.

It is controlled by salt or ice taken into the stomach and cold applications over the abdomen.

Hemorrhage from the bowels in individuals is apparent health, or from hemorrhoids is, as a rule, not dangerous. It may be controlled by recumbency and applications or injections of iced vinegar.

Hemorrhage from the lungs of those suffering with consumption is most alarming, but from individuals in apparent health is of little consequence. Treatment consists in quiet administrations of ice pills, salt, or half teaspoonful of fluid extract of ergot, repeated in a half hour or less time if necessary.

Uterine hemorrhage is best controlled by recumbency with the head lower than the feet, the administration of ergot, and hot vaginal injections.

A general rule which may be of service is, if the flow is above the heart, allow the patient to sit up, and if below have him lie down. The position diminishes the pressure by encouraging gravitation.

Note to Students.—No recitation blank will be issued for this lecture.

LECTURE No. 46.

Botany.

BY HENRY KRAEMER, PH. G., PH. D.

POLLINATION AND FERTILIZATION (Concluded).—THE FRUIT.

(1) *The Gymnosperms* (or naked seeded plants) being such as produce their ovules on scales and the pollen grains fall directly upon the ovules and fertilize them. The *Gymnosperms* are represented by the great Pine Family (or *N. O. Coniferae*).

(2) *The Angiosperms* represent those plants that produce flowers in the ordinary acceptance of the term. The *Anemophilous Angiosperms* differ from the *Gymnosperms* in that they not only possess stigmas, but they are enormously developed and project in the form of long tails, brushes, etc., from the flowers. Their male flowers are seldom immovable, but are generally easily shaken by the wind. Either the axis of the male inflorescence or the peduncles of the male flowers, or the filaments themselves are long and pendulous, and easily moved by the wind or other influence. In some cases, by reason of a jar or otherwise, the pollen sacs open quickly (explode) and discharge all of their pollen at once into the air. Examples of *anemophilous angiosperms* are numerous, as Indian Hemp (*Cannabis sativa*), Hops (*Humulus lupulus*), Castor Oil (*Ricinus communis*), the grasses, many palms, etc.

III. *Zoidophilous Plants* are characterized by either their bright colors, nectar or odor (which may be good or bad). The following groups of animal life are attracted by the flowers and assist in cross-fertilization:

(1).—*Birds*.—The flowers visited by birds are generally spurred or inflated in one or more of their elements. Their color is frequently scarlet and they secrete large amounts of nectar. The birds obtain from the flower either nectar or insects or both.

(2) *Snails* have been observed apparently only by Delapino. In cases where snails effect cross-fertilization the flowers are crowded so closely together that the snails in creeping over them must come in contact with pollen and stigmas. Now, inasmuch as snails are a kind of voracious guest, and will devour anything that is nutritious with which they may come in contact, the plants either secrete an acrid fluid which kills the snail if they insist on eating the part (e. g., *Alcea odorata*), or the perigone is metamorphosed into a thick, fleshy tissue, with whose destruction the snails are content (e. g., *Rhodes Japonica*).

(3) *Insects*.—Plants that produce flowers that require insects to assist in their fertilization are termed "*Entomophilous*." To this group belong many of the flowering plants that produce a colored perigone, odors, and secrete nectar. It is apparent, as one watches a clover-field, for instance, that it is visited by many forms of animal life. In one case a humming bird was seen by the author visiting the clover flowers. The following groups of insects are concerned in carrying pollen from one flower to another:

(a) *Larger Bees* are attracted to diurnal flowers (those that open during the day) whose colors and odors are attractive to man also, as *Salvias*, *Nasturtium*, *Clover*, *Morning Glory*, etc.

(b) *Smaller Bees* and other small insects seek flowers that possess quite incomprehensible attractions for their visitors (e. g., *Herminium Monorchis*).

(c) *Various Diptera* visit flowers that possess mostly dull (yellowish, wine-red, speckled) colors. The odor of these flowers is disagreeable to both man and bees, and their means of attraction is in an exposed surface of nectar or pollen, as in *Wahoo* (*Eucalyptus* species).

(d) *Minute Diptera* visit certain flowers that produce large bracts (as *Arum italicum*) which serve as a means of attracting the Diptera, but also by the production of numerous hairs serve as a kind of a temporary prison until the exerted movements of the insects insure pollination and they receive the pollen of the flower in which they are imprisoned for the purpose of cross-pollination of another inflorescence (See Fig. 107 with descriptive text).

(e) *Carion-Flies* and *Dung Flies*.—The flowers that are visited by these insects have a putrid smell that is disagreeable to man, and they often develop the perigone to flesh-like masses, as in *Rafflesia*.

(f) *Beetles* visit flowers that are large, diurnal, of rather striking colors, and that contain an exceedingly large supply of pollen, besides occasionally some easily accessible nectar. Flowers like *Magnolias* also offer a convenient shelter for the beetle.

(g) *Butterflies* visit flowers that possess bright colors, are diurnal and secrete the nectar at the base of a very narrow tube, as *Pinks* (species of *Dianthus*, etc.)

(h) *Hawk-Moths* visit flowers that are nocturnal (open

at night) and possess light colors with a strong sweet scent. The nectar is concealed at the base of a very long tube or spur, as Honeysuckle (*Lonicera Caprifolium*).

RESUME ON CROSS FERTILIZATION.

In spite of the fact that Sprengel's work was defective in reasoning, it does not detract from the credit that is due him that his work was not only replete in observation, but was also the beginning of the study of the biology of the flower.

The labors of Sprengel were supplanted by men like Robert Brown, etc. Others, like De Candolle, opposed his views.

It is to Knight and Darwin that the credit of

obtaining nature's secret in the correlation of insect and flower is due. Knight first put forth the doctrine that no plant fertilizes itself for a number of generations.

Darwin later supplemented the labors of Knight by his own most extended observations to all life in nature, and said that this law of Knight "is a law of nature throughout the vegetable and animal kingdoms."

FERTILIZATION.

That there is an attraction between the tissues of the ovule, stigma and style and that of the pollen grain is evidenced by cutting sections of the stigma and style of a flower and placing them in a nutrient (gelatin-sugar) solution with some ovules and pollen grains from a different plant of the same species. The movement of the pollen tube sent out by the pollen grain upon its germination is much more pronounced in the direction of the stigma and foramen of the ovule than for that of the style. Pollen-grains have manifested an influence for the stigma when the distance of the latter from the former was equal to twenty times the size of the latter. From experiments of this kind it has been ascertained that the pollen tubes of *Scilla patula* were attracted to the ovules of *Ranunculus acer*; that the pollen tubes of *Primula sinensis* were attracted to ovules of *Digitalis grandiflora*. In some cases pollen tubes have been known to enter the ovules of other species than their own. As to whether fertilization would result is doubtful. In passing it is interesting to note that bacteria and the hyphæ of mold fungi are also attracted to the ovule. There is no doubt some substance present in the stigma, style and ovule which exerts a chemical attraction for the growth of pollen tube as also for hyphæ of fungi and bacteria.

After the pollen tube finds its way into the ovule (Fig.

Fig. 107.—Long section through an inflorescence of *Arum italicum*. (b) bract or spathe, inclosing a fleshy spike or spadix (s) of flowers. The lower flowers are female (p) and the upper are male (a). (h) hairs. The flowers are dimorphic, the pistillate maturing first and are situated underneath the staminate flowers. The insect, covered with pollen that it has received from another inflorescence, finds its way into the opening and travels down to the nectar at the base over the pistillate flowers, which are mature and ready to receive pollen. Here it feeds for a day or so, and becoming satisfied seeks to exit. In the meanwhile a large number of hairs have been produced at (h), so that the insects are unable to exit. The staminate flowers during this time mature and the insects, frantic in their efforts to exit, become covered with pollen, and about this time the hairs wither and drop away, and the insects emerge, only to go to another inflorescence to repeat the same story.

70) through the foramen it pushes its way through the cells of the nucellus to the embryo-sac. At the upper portion of the latter we find the female generative cell and two "helping-cells." The latter assist the entrance of the pollen-tube into the generative cell if necessary. In the pollen tube (Fig. 71) are a number of nuclei. The male generative nucleus with its two centrosomes set free inside of the egg-cell or female generative cell (Fig. 72) and the nuclei and centrosomes of both male and female cells arrange for union and finally unite (Fig. 73). There is now produced by this union of male and female nuclei and centrosomes the fertilized egg cell, which possesses but a single nucleus and two centrosomes. These are enclosed by a protoplasm rich in nutritive properties and energy, and containing in fact other organs for utilizing food for the young embryo. This egg-cell divides (Fig. 74) and re-divides (Fig. 75) and from it the embryo of the seed is developed, and by a similar process of division the plant (the tree) is made up. The results of the changes in the ovary and ovule we shall immediately consider under fruits and seeds.

FRUIT.

As a result of the fertilization of the ovule or ovules, the elements that are to play no further part, either in protecting the seed or seeing to its disposal, soon wither, die and finally disappear from the plant. In *Atropa belladonna* one hour after pollination the stigma turns brown and the style drops away with it adhering. The

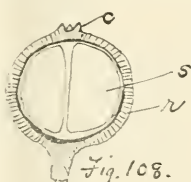


Fig. 108.

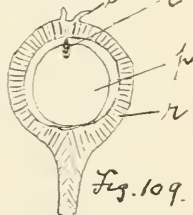


Fig. 109.

petals likewise lose their color, wither and fall away. The reason that orchids of our green houses retain their beauty for so many days is owing to the fact that fertilization has not been effected. The stigma may persist in some cases, as in *Papaver*. The style may remain, as in *Ranunculus*, or even grow, as in *Taraxacum officinale*. In some cases the calyx persists, as in orange, *Belladonna*, etc. In other cases the calyx may even grow with the walls of the ovary and become fleshy, as the accrescent calyx of *Pimenta* (Fig. 108). The fruit is derived from the ripened pistil. The ripened ovary may be all that constitutes the fruit. The style and stigma may persist (Fig. 109) or even the calyx may persist as a fringe, in the fruit of Composite *Arnica* (Fig. 81 and 82, etc.), or it may become fleshy, as in *Pimenta* (Fig. 108).

The wall of the fruit is called a Pericarp. Like a leaf, it consists of three distinct layers, viz.: two epidermal (or skin) layers and a layer in between.

Epicarp (Exocarp).—The outer layer, corresponding to the outer layer of the ovary, is called the epicarp or exocarp.

Endocarp (Putamen).—The inner layer, corresponding to the inner layer of the ovary, is called the Endocarp, or from the fact that it is sometimes hard and stone-like (as in some fruits of the X. O. Rosaceæ) the Putamen.

Mesocarp (Sarcocarp).—The middle layer is called the Mesocarp, and from the fact that it is sometimes fleshy

Fig. 108.—Superior Drupe of *Cneph.*—(s) remains of style; (r), pericarp or wall of fruit containing oleo-resin; (e) embryo; (p), perisperm.

Fig. 109.—Inferior Drupe of *Pimenta*.—(c) remains of calyx teeth; (r), pericarp or wall of fruit containing volatile oil; (s), seed.

or succulent is called the *Sarcocarp*. The fruit encloses the seed and hence is of such a nature that it serves two purposes, viz.:

(1) Protection.—The pericarp must protect the seed during the process of development and until it is fully matured.

(2) Dispersion.—It must be of such a nature that it can provide for the proper disposal of the seed.

Both of these offices are attained by the production of additional developments, as appendages of one kind or another, or by the production of either agreeable (edible) or distasteful substances. Not infrequently the plant produces distasteful substances in the Pericarp during the process of ripening of the seed, as in persimmon, apples, etc. But when the seeds are fully mature they become edible and eagerly sought by animals.

There are a number of distinctive and descriptive names applied to fruits. Some of the more important ones are the following:

1.—*Akene*.—An *Akene* is a dry (i. e., not fleshy), indehiscent (one which does not open) fruit, in which the Pericarp is more or less firm, and while not united with the seed, still the latter almost completely fills the cavity formed by the developing Pericarp, as in Sunflower, Arnica, Dandelion, etc.

(a) *Inferior Akenes*.—In the N. O. Composite the akenes are inferior, i. e., united with the calyx.

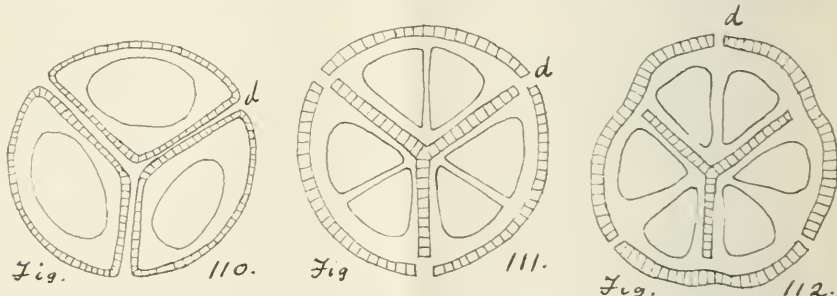
(b) *Superior Akenes*.—In the fruit of the Rose the

compound ovary took place. Inasmuch as this separation is by means of the walls or septa (dissepiments) of the united carpels, this form of dehiscence is called *septicidal* (Fig. 110). The seeds are therefore discharged by the carpels opening along the united margin of the capillary leaf, i. e., along the ventral suture.

(b) *Marginicidally Septifragal*.—In mustard we observe that the carpels remain united through the central united portion bearing the seeds, and that from this the carpels separate. These partial carpels are called "valves." The splitting in this case occurs along the margin of the united portion and is therefore called sometimes "marginicidal." But as the valves separate from the walls or septa it is also called "septifragal." The term best suited for the kind of dehiscence we find in mustard, etc., is "marginicidally septifragal" (Fig. 111).

(c) *Loculicidal Dehiscence*.—In other cases, as in Iris, Cardamom, etc., the septa at maturity remain united and the carpels split at their middle back portion (corresponding to the midrib of the leaf). The cavities of the carpels (so-called "cells") or loculi are broken into. This form of dehiscence is therefore called *Loculicidal Dehiscence*. This is the form characteristic of Iris, Euphonia, Hibiscus, Cardamom (Fig. 112), etc.

(d) *Porous Dehiscence*.—In Papaver capsules there is a partial dehiscence, there being but a few openings underneath the united stigmas from which the seeds are



akenes are superior, i. e., free from the calyx. They are situated inside of the urn-shaped calyx.

(c) *Akenes Imbedded in a Fleshy Receptacle*.—In the Strawberry there is a collection of akenes imbedded in a fleshy receptacle.

2.—*Berry*.—A berry is a fleshy, indehiscent fruit, i. e., one in which the fleshy *Mesocarp* (*Sarcocarp*) is prominent, as in Grape, Capsicum, Phytolacca, etc.

(a) *Superior Berries* are those in which the calyx does not enter into the composition of the fruit, or at least is free from the Pericarp, as Grape, Capsicum, Tomato, Solanum dulcamara, Atropa Belladonna, Berberis vulgaris, etc.

(b) *Inferior Berries* are such as are formed from flowers in which is an adnation between calyx and ovary, as in Banana, Currant, Gooseberry, Cranberry, etc.

3.—*Capsule*.—A capsule is a dry fruit which consists of two or more carpels which separate at maturity, e. g., Mustard, Stramonium, Ricinus, Iris, etc. Capsules are the most abundant of all fruits.

Dehiscence in Capsules may occur in five different ways:

(a) *Septicidal Dehiscence*.—If we examine the fruit of the Castor-oil plant we find that the carpels separate from each other along the walls where union in the

exelled by the swaying to and fro of the capsules by the action of the wind. This form of Dehiscence is known as *Porous*.

(c) *Circumcissile Dehiscence*.—In *Hyoscyamus*, *Purshiana*, etc., the dehiscence is not vertical, but transverse, so that a portion of the capsule like a lid comes off from the remainder. This form of Dehiscence is irregular or abnormal to the sutures of the carpel, and is termed "Circumcissile Dehiscence." Fruits (Capsules) that possess this form of Dehiscence are termed "Pyxis."

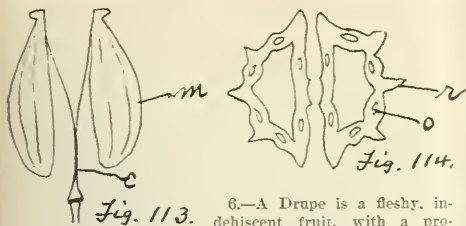
4.—*Caryopsis*, or grain, is the fruit of the plants of N. O. Gramineae, which yield corn, oats, etc. It is distinguished from an akene by possessing a thin pericarp which is closely adherent with the thin seed coats of the seed.

5.—A *Cremocarp* is a dry, indehiscent fruit which consists (Figs. 113 and 114) of two inferior akene-like products called "*Mericarps*." Each of these is plano-convex (the convex side being outermost) and they are separated from the plane side from each other by means of a stalk called a "*carpopore*." The *Cremocarp* is the characteristic fruit of the N. O. Umbelliferae. These fruits possess on the convex side about five prominent ribs. Smaller ribs may be present between these. A cross section reveals an interesting structure, as may be seen in the medicinal umbelliferous fruits. The sections show between the ribs or upon the plane surface or both a varying number of oil secretion vessels ("*vittae*") which are characteristic of the different species.

Fig. 110.—Diagram of septicidal dehiscence in ripe fruit of Castor oil plant; (d), point of dehiscence.

Fig. 111.—Diagram of septifragal dehiscence in morning glory fruit.

Fig. 112.—Diagram of loculicidal dehiscence in Cardamom fruit of commerce.



6.—A Drupe is a fleshy, indehiscent fruit, with a pronounced succulent sarcosarp and a hard stony endocarp, as in Prune, Cherry, etc.

(a) Superior Drupes are without an adherent calyx, as in Prune, *Piper nigrum*, *Rhus glabra*, *Cubeba* (Fig. 109), etc.

(b) Inferior Drupes possess an adherent calyx, as in *Pimenta* (Fig. 108).

(c) Dry Drupes.—The smaller drupes, as *Cubebæ* (Fig. 109), *Pimenta* (Fig. 108), etc., are collected unripe and are somewhat dry.

(d) Collection of Drupes (Eterio).—In some plants, as in Raspberry and Blackberry, there is a collection of little drupes making up the fruit. The name given to this collection of little drupes is "Eterio."

Raspberry and Blackberry are distinguished from each other in that the former possesses drupelets which cohere more or less to each other, and are separated by a very slight receptacle. In the Blackberry the little drupes are situated in a core-like product, the fleshy and juicy receptacle.

7.—A Follicle is a dry, dehiscent fruit which consists of one or more separate carpels. The dehiscence is along the upper or inner (i. e., ventral) suture, as in the following: *Delphinium* (single carpels); *Aconite* (three to five carpels); *Illicium* (consisting of seven to eight carpels).

In *Magnolia* the carpels are imbricated over each other and are somewhat fleshy or succulent (drupaceous). When mature they open along the dorsal (or outer) suture and the seeds drop out.

8.—A *Agbalus* is the fruit of the Juniper (one of the Gymnosperms) and consists of three seeds borne on three open scales. The latter have become fleshy and coalesced.

9.—A *Hesperidium* is a fleshy, indehiscent, superior fruit, in which the pericarp is more or less leathery and the ovarian cavity made succulent by the production of numerous secretion hairs which fill the cavities. These hairs contain a sugary and an acid solution, while the outer part of the pericarp is rich in oil secretion cells, as in Orange, Lemon, etc.

10.—A Legume is a fruit which may be either dry or fleshy, dehiscent or indehiscent.

(a) A dry dehiscent legume we find exemplified in the ordinary pea. Here we find that the dehiscence takes place along both sutures. The carpel thus divides into two halves called "valves."

(b) In *Cassia Fistula* we have a good illustration of a fleshy indehiscent legume. This consists of a long carpel marked on the ventral side by a shallow groove, and on the dorsal side by a fine ridge. It is divided transversely by numerous partitions into a large number of cavities, each of which contains a dark sweet pulp and encloses a brown glossy seed.

(c) Loment.—In some cases legumes are indehiscent, but break up into a series of joints which are dispersed much the same as winged fruits. Jointed or articulated legumes of this kind are characteristic of *Desmodium*, etc., and are called "Loments."

11.—Nut.—A nut is a dry, indehiscent fruit, usually

Fig. 113.—Cremocarp of Fennel. (m), mericarp and (c) cuprophore.

Fig. 114.—Transverse section of Cremocarp of Fennel. (r) ribs; (o) oil secreting cells or vittæ.

with one cavity and one seed. The pericarp is hard and stony, as in Acorn, Chestnut, etc.

(a) Cupule.—The nut is frequently subtended or enclosed by the developed bracts or scales, as in Acorns, Chestnuts, etc. These scales, because they sometimes form a cup-shaped receptacle for the nut, are termed a "Cupule." This latter name is applied to the collection of scales that either subtend or surround the nut.

(b) Glans.—The term glans is given to a fruit consisting of a nut and cupule, as acorn of oak. In the Walnut and Hickory the more or less fleshy hull is looked upon as being a kind of cupule, rather than a fleshy pericarp.

12.—A Pepo is really a kind of an inferior berry. It possesses a fleshy pericarp, but in addition the placentæ have become greatly developed to a succulent and edible layer. As illustrations of a Pepo we have the Watermelon, Cucumber and other fruits of the *N. O. Cucurbitaceæ*.

13.—A Pod is a general term used to designate all dry and dehiscent fruits, as Capsules, Follicles and Legumes. Of these the capsules are made up from two or more united carpels. The follicle consists of one or more separate carpels. The Legume consists of but one carpel. Capsules are syncarpous and Legumes are apocarpous.

14.—A Pome is the name applied to an indehiscent fleshy fruit derived from an inferior ovary, as that of Apple, Pear, etc. According to Prof. Sargent the apple is to be considered as a fleshy enlargement of the receptacle or the flower-stalk. It has been considered by various authors to be an enlargement of the base of the stamens, of the calyx, of the corolla or all combined. The carpels (or core) make up the endocarp and are parchment like.

15.—A Samara is a fruit that may be likened to an akene, only that it has a wing-like appendage to the Pericarp. The Samara then is a dry, indehiscent, one-seeded fruit provided with a wing. The winged-appendage may be at the apex of the fruit, as in White Ash (*Fraxinus Americanus* L), or may be around the fruit, as in Elm (*Ulmus Americana* L) and Hop-tree or Shrubby Trefoil (*Ptelea trifoliata* L).

There may be several Samaras united together, just as we have found several follicles or akenes to be united. Instances of double Samaras we have in the Maple and Negindu.

16.—A Sorosis is the name given to the fruit of the Mulberry, Pineapple, etc. In the Mulberry the inflorescence consists of a head of flowers. After fructification the calyx becomes fleshy and encloses an akene. The latter seems to possess more of a fleshy than hard stony character.

The Pineapple produces a spike of flowers, from the apex of which a leafy stem is produced. This latter when placed under the proper conditions will take root, produce another inflorescence with leafy stem, and the latter may be again propagated. This is done in practice, and has been done for many centuries. The result is that the flower has become sterile and seedless and all of its parts together with bracts and axis of the stem, blend in ripening into one fleshy and juicy mass.

17.—A Strobile or Cone are terms used to describe the fruiting products of either angiosperms or gymnosperms. Generally, by the term Cone one understands the products of a Gymnosperm, as of the *N. O. Coniferae* (say Pine, Hemlock, etc.) These are naked seeded and protected by a scale that is open and corresponds to the ovary of the Phanerogams.

In Hop (*Humulus Lupulus*) the fruit consists of a series of true bracts; at the base of each one there is an akene-like fruit. To this also is the name Strobile or Cone applied.

18.—A Syconium is a name applied to the fruit of the Fig. Here the inflorescence consists, instead of the usual projecting rhachis bearing its flowers, as in Mulberry, of a hollowed stem inside which the flowers are pro-

duced. The flowers are inconspicuous, and consequently the fruit appears to spring from something other than an inflorescence. The ripe fruit, as seen in commerce, consists of a fleshy rhachis enclosing a large number of small akenes that might readily be mistaken for seeds.

19.—A Utricle is an inferior akene that has a thin and more or less loose pericarp. This is the fruit which is characteristic of some species of Chenopodium.

PRACTICAL STUDIES.

(21) Examine Capsules of Castor Oil (*Ricinus communis*), Jimson weed (*Datura Stramonium* L). Examine first as to shape; color; length of stalk, whether inferior or superior. Then ascertain number of cells from ridges or depressions upon outside of capsule. Are the remains of the style or stigma present? If so does the number conform to that of the ridges or depressions upon outside of the fruit? Cut transversely across the capsule and ascertain the number of carpels that have made up the fruit. Are there the same number of cells as carpels? How many seeds are there? How do they lie in the capsule and how are they attached? Are they anatropous, campylotropous or orthotropous? What is their color and markings? How does dehiscence of capsules take place? Is it longitudinal or transverse or by means of pores? If the dehiscence is longitudinal is it through the septa or through the cells? Make drawings showing the manner of development and of dehiscence. How are these fruits protected? By what special means are the seeds disseminated and protected after discharge from the capsules?

(22) Examine Drupes of Cherry, Prune, Peach, etc. Compare first as to size, color externally, whether stalked or sessile. Is it the development from a single or compound ovary? Compare if possible with the blossoms. Is it superior or inferior? Of how many layers does the pericarp consist? What is the thick fleshy layer called? How thick is it compared to the other layers? What is the stony part called? Is it a part of the walls of the fruits? Are there any ridges or anything to indicate sutures upon this portion? How many seeds are there inside of this stony portion? How large are they and how are they attached? Are they anatropous, campylotropous or orthotropous? Examine the seeds and observe whether they are albuminous or enalbuminous? Soak seeds in water for several hours and separate the embryo from the seed coats and make out cotyledons, root and stem portions. How are the fruits protected during the process of ripening? Is there anything produced upon ripening of the fruit whereby its disposal may be insured? How are the seeds protected? Is there any other than a mechanical means of protection?

(23) Umbelliferous Fruits.—Examine Coriander, Fennel, Anise, Carum and Conium fruits. What are the shape and color externally? Are both mericarps in all of the U. S. P. umbelliferous fruits present? Does this indicate any difference in the time of collecting? Those that are collected unripe or nearly ripe consist of how many mericarps? Is the stalk in all of the fruits of the same length? Any indications of the remains of style and stigma? How many ribs? Are these all alike? What is the stalk between the mericarps called? Imbed the fruits in holes bored in a cork by means of the pointed end of a file. Insert the fruits previously moistened with a little gum arabic mucilage. Allow to dry and then cut off thin sections. Mount these thin sections on a glass slide with a little glycerin and observe the number of ribs; presence or absence of oil-secreting reservoirs (vitte); number of vitte, shape of transverse section.

—John Tassell, a Cleveland druggist, was arrested a few days ago on the charge of passing counterfeit money.

—W. A. Depuy has bought the stock at Rolla owned by the late Dr. Cowan.

(Special Correspondence.)

AFFAIRS PARISIAN AND PHARMACEUTICAL.

Paris, Jan. 19, 1898.

The circular which the French Pharmacists' General Association had sent out to the various syndicates on the "patent medicine" question had only resulted in 3,500 adhesions, and failure was feared. But another communication, posted at the last moment to each individual pharmacist, brought up the total of the signatures to 5,200 in favor of the agreement with the manufacturers of proprietary articles. As this latter body only exacted

5,000 favorable votes, it is to be hoped that some decisive action will now be taken to settle this burning question. It should be understood that the French pharmacists only number a little over 9,000 altogether.

Pharmacists Keep Christmas.

The Paris Pharmacists' Syndicate held its annual banquet at Marguery's restaurant on Dec. 20. Over 80 guests arrived, mostly at the last moment, and the perplexed organizers had to accommodate the overflow at a side table. After dinner M. Pelisse, chairman, and Prof. Planchon spoke of Pelletier and Caventou, while M. César Dural alluded in sarcastic terms to his colleagues of the Chamber of Deputies, for the dissolution is approaching, and the pharmacy bill is as far off as ever. Then came the concert, organized as usual by M. Faure, the pharmacist-impresario, which included recitations by M. Paul Mounet, of the Comédie-Française, vocal selections by M. Faure himself and some professional talent. That the company only separated about 3 a. m., is the best proof that they thoroughly appreciated their indefatigable colleague's entertainment.

By the way, the syndicate has inscribed about 60 new members during the last three months, and has just invested a little surplus of \$1,400 in the funds.

The Christmas Eve Supper

of the Assistants' Syndicate was presided over by M. Gerville-Reache, of the Chamber of Deputies. The president and secretary of the Drug Clerks' Association, M. M. Robert and Bequs, dwelt, in their speeches, on the importance of union and the desirability of a weekly rest, a properly arranged night service, time for meals, and other boons for the pharmacist's assistant. That the latter thoroughly appreciate their rare pleasures was evident when the floor was cleared for a dance, and the conical paper headresses the young people had assumed at dessert gave an original and carnivalesque aspect to the ball, which was interspersed with glees by a vocal union and terminated by a tombola.

The Legion of Honor.

The New Year in France is always marked by the distribution of "decorations" to those who have served the nation. Among the new "Chevaliers" are M. Bouchardat, professor of hydrology and mineralogy at the Paris School of Pharmacy; M. Geo. Lefebvre, the chemical manufacturer; M. Auguste Lumière, of photographic fame, and colonial pharmacist Congoulat. Nor should the only lady named "Mother" Boddard (the old head nurse at the Salpêtrière, so well known to pharmacy "internes") be forgotten.

The Pelletier-Caventou Subscription

is making good progress, about \$2,000 having now been inscribed. Of this some \$150 comes from the States. I



M. SONNERAT.

note the names of Messrs. Fairchild Bros. & Foster, of New York; M. N. Kline, Rosengarten, Powers & Weightman, J. M. Perot, J. L. D. Morison, Ryan, Bullock, Sadtler, Cliffe, Kraemer, Schoemaker, England, Wiegand, Claude Field, Peacock, and H. Trimble, of Philadelphia; Beringer (of Camden), and Lemberger, of Lebanon, Pa.

As the idea is to inaugurate the statue in 1900, at the time when our Continental and Transatlantic colleagues will be gathered here for the Congress of Pharmacy, the international character of the subscription is gratifying. About \$6,000 will be wanted for a handsome monument, and with cordial foreign co-operation, this figure should be reached.

Prizes for French and American Savants.

On Jan. 10 M. Chatin made his farewell speech as chairman of the Academy of Sciences, for the distinguished pharmacist's functions as president terminated with the New Year, and the annual prize list was read. Prof. Sabatier, of Toulouse, took the \$2,000 La Caze prize, for his researches in mineral chemistry, while M. Lenard, one of the pioneers of the "X-ray" discovery, had the same reward in the physics section. M. Haller, creator of the Chemical Institute at Nancy, received the Jecker prize (\$2,000), for his studies on camphor, coal tar colors, etc., while Prof. Bourquelot, of the Paris School of Pharmacy, was awarded the Montagne (botany) prize for his work on mushrooms. Prof. Marsh, of Yale, is the winner of the \$300 "Curvier" triennial prize; the printed report contains most flattering allusions to his researches in paleontology.

The Paris Society of Pharmacy

held its New Year's meeting on the 5th inst., when M. Sonnerat, after a short speech, ceded his chair to M. Bourquelot, the new president, whose name will be so familiar to your readers, and whose portrait accompanies this article. M. Leidie took his place as vice-president, and M. Boquillon as secretary for 1898.



M. BOURQUELOT.

M. Guinochet then read the report of the work of the society during the past year, a long but interesting document. He referred to Prof. Prunier's new theory on the formation of ether, and described his process for the preparation and testing of neuter acetic ether by reaction of acetic acid on sulphuric acid. M. Bourquelot had sought the origin of the brown color sometimes to be noticed on gum arabic, etc. He believes this produced by an oxidizing ferment contained in the gum acting on certain astringent substances present in the mortified portions of the bark.

M. A. Petit (in collaboration with M. Polonowski) had presented some notes on the alkaloids of jaborandi. Pilocarpine and pilocarpidine had been obtained for the first time in a pure state, the latter in large transparent prisms, and after several unsuccessful experiments the pilocarpine and pilocarpidine acids had been isolated in the form of syrupy masses. M. Petit thinks these substances are isomers and not homologous, as supposed by Hardy. M. Patein had continued his experiments on the combinations of antipyrine. M. Béhal (with M. Francois) had contributed a most original and exact paper on chloroform, which would give the pharmacist new weapons in his struggle to assure the purity of this important sub-

stance, and M. Grimbirt, true to his microbiological studies, had discovered four new pneumobacilli.

M. Léger had shown how the various alcohols could be identified by reagents, and M. Moureu had treated of various points of inorganic chemistry. M. Julliard's long experience of practical pharmacy had led him to criticize the Codex formula for acetic acid: give some notes on distilled waters, etc., etc.; while M. Planchon had continued his ever popular sketches of the history of pharmaceutical education. Various other contributions were also named and analyzed.

After the conclusion of this report, M. G. Dethan and M. Dufau came forward to receive the medals awarded by the society. M. G. Dethan, who treated the question of lady pharmacists in so clever a manner at the Brussels Congress, won his "Natural Sciences" medal by a thesis on the Acanthaceae. He is a preparator at the School of Pharmacy. Military Pharmacist Burcker is leaving Paris for Marseilles. One of the best known faces at the Society of Pharmacy, his departure is regretted by his colleagues.

Current Parisian Topics.

Next to the Dreyfus case, the influenza is the great subject of conversation. The epidemic is keeping both pharmacists and doctors busy, not to say overworked. Some savants are hunting for the influenza bacillus at the Pasteur Institute and elsewhere.

M. Duclaux, head of the Pasteur Institute, has helped to swell the news columns by his personal opinion on the Dreyfus case, while the leader of the movement, M. Scheurer Kestner, is an Alsatian chemical manufacturer.

Alphonse Daudet's death takes from us a charming writer, who delighted in sketching doctors and pharmacists in his novels. Bezuquet & Pascalon, the Tarascon pharmacist and his assistant, were possibly drawn from life, like many of his characters, but are rather caricatures than portraits. They will be familiar to your readers by the publication of "Port-Tarascon" in a leading American magazine. Dr. Rivals in "Jack," and Dr. Jenkins, in the "Nabob," are more seriously depicted, the country practitioner and the cosmopolitan quack.

Science and Crime.

To have one's head for 45 minutes under the X-ray apparatus is better than as many seconds under the guillotine. So Vacher, accused of nearly a score of murders, consented to have his head radiographed last week. A bullet found in his skull, close to the brain, is a relic of an attempt at suicide years ago. It may save his life this time, as lunacy will be pleaded.

The Carrara case raises the question as to whether a human body, skull included, can be so effectually incinerated (without a special furnace) as to leave no trace behind. Experts differ: the jury will probably have to decide.

Homeopathy

never seems to have obtained much success here, probably to some extent because it is not recognized by the faculties or taught in any government establishment (and few French educational institutions are supported by private endowment). There are nine pharmacies in Paris exclusively devoted to homeopathy, but the ordinary officines which stock and show the remedies prescribed by Hahnemann might be counted on the fingers of one hand. Paris has two homeopathic hospitals and perhaps 60 doctors. An attempt was made to propagate the movement by public lectures some three or four years ago, but the experiment was, I believe, not repeated.

Kentucky's legislature is struggling with what is known as the "Chinn Pure Food Bill," which is said to be so long that it takes five or six hours to read it; South Carolina and Maryland are other States which are trying to secure the passage of bills providing for the inspection of food, drugs, etc.

CHINESE MEDICINE AND PHARMACY.

J. Thomas Scharf, ex-United States Chinese Inspector, has written for the Evening Star, Washington, D. C., an exceedingly interesting paper, which we quote, quite fully, as follows:

My experience among the Chinese has brought me in contact with the strangest medical system in the world. If any local county medical society were to look into the methods pursued by the Chinese physicians in the United States there would be found material enough to keep that society occupied in the law courts for years.

It is a fact not generally known that nearly every Chinese mercantile store in this country has attached to it a Chinese doctor and a pharmaceutical department. In China every one chooses his own occupation, and any person may assume the title of physician without having given previous evidence of his professional competency. There are no medical colleges and no examination tests exist to worry the minds of the would-be practitioners. And neither are diplomas asked for or granted. Any quack or the most ignorant bumpkin may become a practicing physician, and by his success or non-success in the profession he stands or falls. This unlimited liberty of selecting an occupation has resulted in making the Chinese medical profession enormous, and when the Chinese start a business a Chinese doctor is always included as one of the partners and he acts as physician and apothecary for the firm. In China Chinese apothecaries, before they can carry on their business, must pass an examination and must exhibit a diploma from the examination board. Medical study consists in mechanically learning the old Chinese medical works, and, when possible, the inherited knowledge of remedies all in accordance with the Chinese maxim, "The older the better."

When a physician has been unsuccessful he retires with the common Chinese adage, "There is medicine for sickness, but none for fate." Sometimes an invalid will go to a doctor and ask for how much he will cure him and how soon the cure can be performed. He states the diagnosis of his case, the pulse is examined and every other symptom investigated, when a bargain is struck and a portion of the price paid. The patient then receives the suitable medicines, in quantity and variety better fitted for a horse than a man, for the doctor reasons out that out of a great number it is more likely that some will prove efficacious, and the more he gets paid for the more he ought to administer. A decoction of a kettleful of simples is drank down by the sick man, and he gives up both working and eating; if, however, at the expiration of the time specified he is not cured he scolds his physician for an ignorant charlatan, who cheats him out of his money, and seeks another, with whom he makes a similar bargain, and with probably similar results. The visits and examinations are very reasonable in price and vary in amount from 15 cents to \$1. The fee is wrapped up in red paper and is called "golden thanks." The prescriptions furnished are remarkably large.

Heavenly and Earthly Spots.

The pathology (shaug-han) of the Chinese is very incomplete. All diseases, especially epidemic diseases, are ascribed to spirits and winds, and cold and warm humors, etc., are assigned in accordance with their benign or malign character to Yo (the good principle) or Yu (the evil principle). To Yo belongs acute inflammatory fever, to Yu, hectic fever, etc. There are, according to Chinese pathology, 10,000 varieties of fevers. They imagine there is a distinct and different pulse in every part of the body. They "play upon" the pulses as is done in playing the piano, where we feel it. In this practice the changes of the moon and the season of the year are considered. The performance often lasts several hours in the "heavenly spot"—the upper part of the carotid artery, or on the "earthly spot," near the ankle, or the "human spot," at

the wrist, with three fingers—sometimes on the right arm, sometimes on the left, now higher up, now lower down, now on one side, again on both sides, etc. The three fingers used are the index, the middle and the little finger. Dequise, the index finger, indicates the spirits of the liver; Quan, the middle finger, the spleen, and Shaker, the little finger, indicating the heart. In diseases of the heart, the left pulse is investigated, in those of the liver the right. Each speck of the tongue and every discoloration of the organ points to special diseases and viscera. Thus, a red tongue indicates warmth of the heart—and the south! a white tongue—the lungs—and the west, etc.

Anatomy and physiology occupy the lowest grade in Chinese medical science. In their veneration of the dead dissection of the human body is, of course, excluded, and they never practice amputation. They assume six chief organs in which the "moisture" is located, viz., the heart, liver, two kidneys, spleen and lungs; six others in which is the seat of "warmth," viz., the small and large intestine, the gall bladder, the stomach, and the urinary apparatus. They do not know the distinction between arteries and veins, and call the heart "the husband" and the lungs "the wife." The Chinese enumerate 365 bones, including eight for the male and six of the female cranium, twelve ribs in men and fourteen in women. The circulation, according to their ideas, flows outward from the lungs five times in twenty-four hours and terminates in the liver. The bile is the special origin to the voice; the spleen is the seat of reason, and with the heart, furnishes ideas; the liver is the granary of the soul, while the stomach is the resting place of the mind, etc. Chinese phrenologists look for the principal characteristics of a man in his forehead, and for a woman in the back part of the cranium.

Their Idea of Surgery.

There is a distinction between physicians and surgeons, and it is more sharply defined than with us. Every man is expected to stick to his own branch of the profession. The surgeons are extremely ignorant, are assigned to inferior service and receive little pay, so that their shops are poor. Chinese surgery (wae-ka) embraces the practice of acupuncture, which is regarded as a universal remedy, and has for its object the quickening of the "vital spirits." It is practiced by twisting or driving a needle inserted into the body and in the first case is called *neuschibari*, in the last *udschibari*. By this operation a free passage is supposed to be made for the "winds." Besides this, Chinese surgery includes application of moxes, cupping, inoculation, paracentesis of the eye and bleeding. Surgical operations are chiefly confined to removing a tooth, pricking sores and humors with needles and trying to reduce dislocations and reunite fractures by pressure or bandaging. Sometimes they successfully execute more difficult cases, as the operation for a hare-lip and insertion of false teeth. Under ordinary circumstances, they make shift with poultices—in this live cat's liver is specially popular—while fractures are treated by extension. Poultices made of many strange or disgusting substances are applied to injured parts. In one case a man who, having injured his iris by a fall, was ordered by his physician to cut a chicken in halves, laying a portion on the eye as a cataplasm and eating the other as an internal cure. Vivisection is rarely attempted, but leeches and cupping are employed to remove the blood from a particular spot. Kneading of the muscles (massage), which is said to have been in use 2,000 years before Christ, is likewise practiced. The Chinese also claim to have been able for thousands of years to produce anesthesia by means of the preparation, *mago*.

Novel Drugs.

The Chinese despise our science, and prefer to swallow down mighty mixtures fearfully and wonderfully brewed, which for ever so many hundred years have been men-

tioned as infallible remedies. The Chinese pharmacology consists of forty octavo volumes, and contains remedies from the vegetable and animal kingdoms almost exclusively, and is very copious. It includes 650 different kinds of leaves, about 350 vegetable medicines, 50 mineral and 78 animal. The use of acids and reagents is unknown, for they imply more knowledge of chemistry than the Chinese possess. Their medicines are arranged under six heads—tonics, astringents, resolvents, purgatives, alteratives of poisonous humors and of the blood. Among many herbal medicines, which undoubtedly are more or less tonics, we find that the same qualities are ascribed to stalactite, fresh tops of stag horns, dried red spotted lizards, silkworm moths, black and white lead, tortoise shell and dog's meat.

By the same stretch of the imagination the bones and teeth of dragons, oyster shells, loadstone, talc and gold and silver leaf are regarded as astringents; while verdigris, calcareous spar, catechu pearls, bear's gall, shavings of rhinoceros horns and turtle shell are used as purgatives. Elephant's skin, and, with a certain consistency, ivory shavings, are considered to be antidotes to poison. The genuine ginseng root and the edible nests of the swallow are considered veritable panaceas, and are specially prized by the Chinese as aphrodisiacs. In fact, ginseng, which used to be sold for eight times its weight in silver, stands at the head of all remedies. Tea, in various modes of preparation, is much valued as a medicine, and different parts of rare animals are included in the list with the reputation of properties as multifarious and inconsistent as the pills of a quack. Almost every animal supplies a distinct specific, particularly its blood and its liver. In debility the extract of tiger's blood is prescribed. Among the agents employed are many strange and repulsive substances, as snakes, including rattlesnakes, lizards, bears' gall, dried spiders, bugs, toads, claws, ears, tongues, hearts, livers of numerous animals, dragon bone, cotton, ivory, musk, rhubarb, gentian camphor, fossil bones, rhinoceros or hartshorn shavings, silk worm, asbestos, moths, Chinese seeds, leaves in large doses, fungi and innumerable other things. Calomel, vermilion, red precipitate, minium, arsenic, plumbago, mercury and sulphate of copper are among the metallic medicines used by physicians. Then, of course, exorcism by physicians (in epidemics, with dragon banners in front, burning scraps of colored paper, inscribed with formulae of incantation, firecrackers, etc.), and similar superstitious observances, are not wanting.

A HUMANE RAT TRAP.—A recently issued patent in the way of traps for rats, mice, etc., seems to us worthy of notice (*Sci. Am.*). The inventor describes ordinary traps as "at best inhuman and cruel, as they kill the animal more or less quickly, subjecting it to torture arising from its imprisonment, as well as the possibly much greater torture arising from the contemplation of its impending fate," and adds that "these animals soon become very shrewd, it often happening that after a few have been caught and killed the others become so knowing that it is impossible to tempt them into traps with any kind of bait." As a more humane and efficient method of ridding a house of these pests the inventor provides a trap which, as the rat goes into its wide-open entrance, will spring upon the body of the rat an elastic band to which are attached bells and bunches or tufts of cotton or other material, painted or coated with phosphorescent paint. The rat, it is claimed, will then "immediately run away, with the bells tinkling and the plumes waving, so frightened that he will make a tour of all his holes and runways, meeting all his brethren and frightening them by the sound of the bells, the phosphorescent tufts, and his fantastic appearance." It would not be strange if "this being kept up for a short time would drive all the rats away."

ERNEST SOLVAY,

Who Has Made Soap and Paper Cheap.

Never was such an epoch for stimulating inventions as the years of trial which followed the French Revolution. The Republic, which "had no need of savants" and martyred Lavoisier, soon demanded them. Steel processes, the manufacture of saltpetre, beet-sugar and the Leblanc method of making alkali were the outcome of the dire necessity of France, in a state of practical blockade. The Committee of Public Safety demanded impossibilities, and men came forward and performed them. Leblanc was a surgeon who in his younger days had attended lectures on chemistry at the College of Pharmacy, and he devised the ingenious process which held the field against all comers for three-quarters of a century. Leblanc's alkali-process is not dead yet, but in Ernest Solvay, the Belgian chemist, it has met its most powerful antagonist. He was born at Rebecq-Roijurn, and his father was a salt refiner, a man of some means. Early in his career he was taken by an uncle, who was a manager of gas works at St. Josse-ten-Noode, and made sub-manager. He was always experimenting, always inventing. But the great work of his life seems to have been suggested by his double early training, handling salt in his father's works and ammonia in his uncle's. He began to see the possibilities of their combination, and one day he was powdering carbonate of ammonia in a mortar, and poured into the mortar a solution of salt. The mixture thickened, and Solvay thought he had attained his end. He patented his discovery on April 16, 1861, got funds from his relations and set up a factory. His brother Alfred joined him, and the two worked long and patiently against numberless discouragements, among which were the gradual discovery that their ideas had all been anticipated by chemical workers through the century. Thorn in 1837, Hemming in 1838, Waterlow in 1840, Muspratt, Deacon, Gossage and other English chemists, besides numerous foreigners, had all patented processes more or less similar; but the Solvays worked on. Altogether, it is said, they sank a million and a half of francs. The invention which enabled them to turn the corner and secure the gigantic success which was ultimately theirs was that of the carbonating-column. This was patented in 1867; at the end of that year the Solvay works were producing 3,000 kilos of soda per day. At this day the Solvay process is used in great factories in England, France, Germany, Austria, Russia and America, as well as in Belgium, and is estimated to produce altogether 500,000 tons of soda annually, or more than half of the world's consumption. The price of soda has fallen to one-fourth what it was when Solvay began his experiments, and the consumption has trebled. (Ch. and Dr.)

A NEW INK.

Tannic acid	1 ounce
Pyrogallol acid	1 1/2 dram
Lactate of iron	1 ounce
Sulphate of iron	1 ounce
Pyoktanin	1 1/2 dram
Tartaric acid	1 ounce
Warm water	6 pints

Shake well to dissolve. Set aside for a few days, shaking occasionally. Strain through cotton wool, and add 1 1/2 ounces of fresh mucilage. This ink writes a deep black, and gives good copies, it is said. (Ch. and Dr.)

PAVING BLOCKS OF STRAW have been invented by a Polish engineer. The straw is bound into quadrangular bundles and immersed into a hot solution, whose composition is kept secret by the inventor. Apparently it consists mainly of tar, pitch, rosin and similar substances. The bundles remain in the solution until thoroughly saturated and are then subjected to great pressure. These blocks are claimed to be cheaper than wood for paving and to excel it in firmness, durability and elasticity. Experiments on a large scale are said to have been made with them in Warsaw. (Drug. Ztg.)

PHARMACY.

PYROFORM is a trade name given to bismuth oxydide pyrogallol, which is stated to be useful in skin diseases and to be less toxic than pyrogallol.—(Ph. Post.)

COD LIVER OIL PLASTER.—

Lead plaster	300 parts
Yellow wax	125 parts
Cod liver oil	175 parts
—(Revue Ph.)	

LINIMENTUM EXSICCANS PICK is prepared by mixing 3 parts each of powdered tragacanth, glycerin, and alcohol and adding sufficient water to make 100 parts.

REMEDY FOR WARTS:

Acid, acetic, conc.	10 gm.
Sulphur, præp.	20 gm.
Glycerin	50 gm.

To be painted on the warts daily.—(Südd. Ap. Ztg.)

TO REMOVE PAINT SPOTS FROM SANDSTONE.—This may be accomplished by washing the spots with pure oil of turpentine, then rubbing pipe clay over them and after drying, scrubbing with a solution of caustic soda. Such spots may also be removed with ammonia water. (Drog. Ztg.)

PREPARATION OF CALCIUM GLYCERINOPHOSPHATE.—A mixture of equal parts of glycerin and concentrated phosphoric acid is heated in an enamelled vessel on a sandbath at 130 to 150° C. (265 to 300° F.) for 24 hours, or until the fluid begins to give off suffocating odors. It becomes viscid and acquires a dark color, which must be removed with bone black. To neutralize the excess of phosphoric acid it is best to use tricalcium phosphate, in preference to calcium carbonate, which causes disagreeable foaming. Tri-calcium phosphate converts the free phosphoric acid into di-calcium phosphate, without acting on the glycerino-phosphoric acid. To convert the latter into the calcium salt, milk of lime is used; this precipitates also the phosphate as tri-calcium salt. The liquid, which contains the glycerino-phosphate, is filtered, evaporated to a syrupy consistence and poured into 10 times its volume of alcohol. The mixture is boiled for one hour, again filtered and this treatment repeated until evaporation yields a perfectly white, amorphous powder. (Ph. Centralh.)

PERU-COGNAC.—Stated to be a solution of the active constituents of Balsam Peru in cognac, the stomach-disturbing, but otherwise inert, resins being excluded. It represents 25 gm. of balsam per liter and is given a tablespoonful in a glass of milk every two hours in tuberculosis of the lungs and of the intestines.—(Ap. Ztg.)

IODOFORM AND BALSAM PERU.—A combination that is claimed to be a more effective antiseptic than iodoform alone, is as follows:

Iodoform	2 gm.
Balsam Peru	4 gm.
Oil of peppermint	5 drops
Vaseline	16 gm.
—(Ph. Post.)	

SPIRIT OF CAPTOL.—This is a hair preparation originated by Dr. Eidhoff, who claims it to be an alcoholic solution of captol, a chemical combination of chloral and tannin discovered by himself. Dr. Aufrecht (Ph. Ztg.) reports it to consist of chloral (0.76 p. c.), tannic acid (0.42 p. c.), alcohol (54 p. c.), and water. In addition it contains minute quantities of tartaric acid, castor oil and etheral oils. (Ztsch. f. Ph.)

FOR HEADACHE AND NEURALGIA, the following mixture is recommended:

Antipyrin	0.5 gm. (8 grains)
Potassium bromide	0.5 gm. (8 grains)
Cocaine hydrochloride	0.01 gm. ($\frac{1}{10}$ grain)
Caffeine	0.02 gm. ($\frac{1}{50}$ grain)
Guarana	0.3 gm. (5 grains)
—(Ap. Ztg.)	

NUTROL.—According to an official analysis in Dresden, this preparation consists largely of maltose (40 p. c.), dextrose (17.3 p. c.), dextrin (16.6 p. c.), and water (24.7 p. c.), with small quantities of pepsin and hydrochloric acid. The conclusion is reached that nutrol has some digestive power, but that it is not justifiable to call it a food, considering the small doses directed to be taken. (Ap. Ztg.)

IODINE TREATMENT OF SYPHILIS.—The following formula is recommended by Bouveyron (La Méd. Mod.): Iodine, 1.0; potassium iodide, q. s. ad. sol.; glycerin, 10.0; citric acid, 15.0; syrup, q. s. ad. 1 liter. The taste of iodine is mitigated by the glycerin and syrup and masked by the acid. The dose is a teaspoonful a half hour before meals, to be gradually increased to six teaspoonfuls.—(Ap. Ztg.)

GLYCERIN-GELATIN AS PASTE.—An excellent page for mounting photographs and similar uses is prepared by the following formula:

Gelatin	16 parts
Glycerin	1 part
Methyl alcohol	12 parts
Water	32 parts

The gelatin is first softened in the water, then dissolved by means of a moderate heat. The glycerin is then well mixed in and the whole poured in a thin stream into the alcohol. (Ztsch. f. Ph.)

CORROSIVE SUBIMATE IN ARTICULAR RHEUMATISM.—Dr. G. Singer asserts that acute articular rheumatism is caused by a specific bacillus, whose decomposition products enter into the blood circulation, in a similar way as pus formations are caused by the staphylococci and streptococci, which are always found in the blood under such conditions. Singer, therefore, recommends intravenous injections of weak solutions of mercuric chloride, in place of treatment with salicylic acid. (Südd. Ap. Ztg.)

BALSAM OF ST. THOME.—This balsam is obtained from Santipropsis balsamifera, a tree belonging to the Burseraceæ and indigenous to the Indian Archipelago. It is called Pan Oloco by the Portuguese, and Gogul or Belam Bo by the natives. The balsam is obtained from incisions in the trunk of the tree, in form of a resin-like juice, which gradually thickens and furnishes an excellent remedy for all kinds of wounds, which it closes completely within a few days. Internally it is used for troubles of the respiratory organs and particularly for diseases of the bladder.—(Ap. Ztg.)

FERMELIN.—A bread preparation claimed to make the dough rise better and to give the bread a thick crust, which prevents it from drying out too rapidly and so keeps it fresh longer. The active constituent appears to be a sort of diastase, which converts a portion of the starch into glucose. Dr. J. Colmann gives the following analysis:

	Percent.
Water	9.85
Mineral matter	1.22
Fat	1.85
Proteins	10.22
Non-nitrogenous nutritive matter	74.76
Cellulose	1.10
100.00	

The preparation is highly recommended by bakers. (Südd. Ap. Ztg.)

NOURISHMENT BY SUBCUTANEOUS INJECTION.—Experiments made by Dr. Boppolis in Turin have given good results in the subcutaneous administration to patients of olive oil, as food. The injections are claimed to be of particular value to diabetics. The oil administered in this manner has the same nutritive value and is assimilated just as well as when taken the ordinary way. Not the slightest inconvenience is caused by the injections.—(Drog. Ztg.)

PURIFICATION OF STORAX.—H. Kreier (Ph. Ztg.) recommends removing water by heating at 103° C. (217° F.), as a waterbath heat is not sufficient to remove it completely. The mass is heated until it flows clear from a spatula and then placed on a waterbath for a few hours to permit the sand to settle. It is then strained through a coarse cloth. The residue may be extracted with alcohol and the filtrate from this evaporated. The author reports adulteration of storax with rosin and castor oil, to the extent of 50 per cent. (Südd. Ap. Ztg.)

PLANT PITH FOR CLEANING OPTICAL LENSES.—As flintglass is easily scratched through rubbing with the customary cleaning materials, the "Jour. f. Ubrm." recommends plant pith for this purpose. The pith of rushes, sunflower stalks or elder is cut out and dried, and fastened upon a piece of cork in the form of a brush. For very small lenses pointed pencils of elder pith are recommended. If the dirt adheres so firmly that it cannot be removed dry, it is best to immerse the lenses in rectified oil of turpentine, ether, or absolute alcohol, and polish them with a piece of clean linen. (Südd. Ap. Ztg.)

PRESERVATION OF FRUIT BY MEANS OF LOW TEMPERATURE.—Experiments have been made to preserve fruit in its natural state by storing in rooms kept at -1° to +3° C. (30° to 37° F.) It kept well for several months, but lost considerably in weight, because of the very dry atmosphere in the storage rooms, the loss being about 1.5 per cent. weekly. A device for keeping the air moist is in process of construction. The experiments have been made so far only with apples and if this method is successful also with other fruits, it will enable the transportation of large quantities from great distances. (Drog. Ztg.)

DECOLORIZING REDDENED CARBOLIC ACID.—One of our exchanges (says Bull. Phar.) gives a process for accomplishing this which is said to be both cheap and effective: Prepare a saturated solution of stannous chloride. As a very small quantity is needed, a drachm of it will go a great ways. Liquefy the carbolie acid with about five per cent. of water; add to each pound of acid about eight drops of the tin chloride solution, and allow it to stand in a warm place. If heated in a waterbath, the process will be greatly hastened. Should the carbolie acid not become decolorized after thirty minutes' standing, add another drop or two of the tin salt solution. Too much salt turns the carbolie acid green, and if this happens all one has to do is to add more carbolie acid.

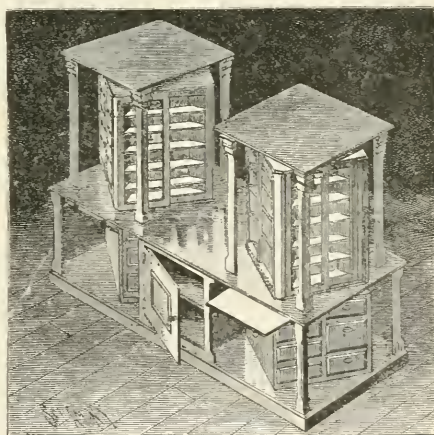
ARTIFICIAL CAOUTCHOUC AND GUTTA-PERCHA.—Another process for the manufacture of substances resembling rubber has recently been patented. Readily oxidizable fixed oils are mixed with tar or similar distillation products and macerated in a bath of dilute nitric acid. When the mixture assumes a semi-fluid condition it is heated on pans or plates. An elastic mass is so obtained, that can be vulcanized and employed as a substitute for, or addition to caoutchouc. For the preparation of gutta-percha 1 to 20 per cent. of shellac is added to the mixture before treatment with nitric acid. To make it very hard, the semi-fluid mass is worked up with slaked or unslaked lime. The ratio of tar or

pitch to oil is about 5 to 75, depending on the consistence of the mass desired. (Ph. Ztg.)

VIOLET INK.—Macerate 40 gm. logwood, 5 gm. oxalic acid, 30 gm. alum and 10 gm. glycerin, with 500 cc. water during 24 hours. Then add 5 gm. potassium bichromate dissolved in 100 cc. water, shake well and let it stand 24 hours to settle. Then boil the clear solution in a copper vessel and after cooling add 50 gm. wine vinegar. The ink should be kept in glass vessels.

BLACK INK.—Mix in a flask 100 gm. tannin, 100 gm. water, 200 gm. solution of ferric chloride (10 per cent.), and 10 gm. crude hydrochloric acid (sp. gr. 1.16), and heat at 80 to 90° C. during 10 hours. Then dilute with 700 gm. water and heat an hour longer, replacing the evaporated water from time to time. Let it settle 2 weeks, filter and bring the weight up to 1,000 gm.—(Südd. Ap. Ztg.)

PREPARATION OF MALT EXTRACT.—The following is recommended by Fellerer in "Südd. Ap. Ztg": One kg. of malt is broken and digested with 1,500 cc. of water heated to 50° C. (122° F.) and 10 drops of concentrated hydrochloric acid. The mash is kept at 45° C. (113° F.) for 2 hours and then 3,500 cc. of water heated to 65° C. (150° F.) added. After 2 hours' further digestion at exactly 60° C. (140° F.), the liquid is filtered and concentrated in a vacuum. The extract so prepared is clear, but somewhat darker than the commercial product, because of the elimination of albuminous matter at 60°, the presence of which makes the extract lighter in color, but turbid. This lighter extract is prepared by keeping the temperature at 45 to 50° C., but it has not so sweet and agreeable a taste as that prepared at 60° C. The addition of hydrochloric acid assists the diastatic action considerably. (Südd. Ap. Ztg.)



PRESCRIPTION CABINET FOR DRUGGISTS, ETC.—The accompanying illustration represents an improved cabinet designed for use in drug stores, hospitals, dispensaries, chemical laboratories, etc., effecting economy in time, space, labor and material. It has been patented by Dr. J. M. Worthington, of Annapolis, Md. (Sci. Am.) It is designed that the medicines shall be so arranged that those given in large doses will be held by large bottles in the bottom portion of the cabinet, while the powerful and dangerous medicines will occupy the smaller upper compartments. Owing to the simple arrangement of revolving drawers and shelves, different attendants may work at the same cabinet without inconveniencing each other.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Per. Alegretta.

(G. E. L.) What is "per. alegretta"?

Bicycle Rim Cement.

(J. A. W.) See this journal, Sept. 30, 1897, page 461.

To Color Silver Polish.

(W. S.) A silver polish composed of whiting, cream of tartar and magnesia may be tinted drab by triturating with a small quantity of burnt umber. Other shades may be made by the addition of raw or burnt sienna, colcothar or rouge (anhydrous sesquioxide of iron), etc. The added substances should be finely pulverized and free from grit.

Making Gasoline "Safe."

(B. H.) We know of no preparation which may be added to gasoline to render it less likely to explode. This tendency is characteristic and it cannot be overcome. In burning gasoline for lighting purposes you should take precautions to keep the flame away from the reservoir containing the supply and also to use a burner you know to be satisfactory. Care should also be taken in filling lamps, tanks, etc., as gasoline is highly inflammable, and its vapor when mixed with air and ignited, explodes violently.

Ammonium Causticum.

(A. P.) The American Homeopathic Pharmacopoeia defines ammonium causticum as synonymous with "aqua ammoniac," "liquor ammonii caustici," "liquor ammoniac fortior," etc., although the same work states that the preparation for homeopathic use is one having a "specific gravity of 0.959, contains ten per cent. of ammoniacal gas, and therefore corresponds to the first decimal potency." Dilutions, 2x and higher, prepared with "dispensing" alcohol are also dispensed under the same general title, the degree of dilution, however, being generally stated upon the label.

Protargol.

(F. H. P.) Protargol is one of the newer remedies produced, according to Dr. Eichengrün (Pharm. Cent.) by combination of silver with certain proteins. It is claimed that this remedy is intended to replace the silver preparations commonly employed which form insoluble compounds with organic tissues when applied to them. Protargol is decomposed neither by acids, alkalis, nor alkaline sulphides, nor is it precipitated by albumin or sodium chloride. It occurs as a bright yellow powder, easily soluble in water, and particularly so when first moistened with a small quantity of the solvent. The bright-brown, clear solutions, which may be made to contain up to 50 per cent. of the remedy, are neutral in reaction, and undergo no change on warming, but simply darken on prolonged heating or continued exposure to light. Protargol contains 8.3 per cent. of silver, and is reported to exceed argonin and argentamine in germicidal power, these latter containing only 4.2 per cent. and 6.3 per cent. of silver, respectively. Concentrated hydrochloric acid yields a precipitate in protargol solutions, consisting not of silver chloride, but of unchanged protargol, which redissolves on dilution with water.

Protargol is claimed to have given excellent results in

gonorrhoea, also as a bactericide and in the treatment of wounds. It is used in 0.25 to 1 per cent. solution, and should be kept in amber glass bottles. Differing from other silver preparations it does not leave spots on the skin or linen.

Solution of Aluminium Acetate.

(G. L. P.) We know of no better formula for this preparation than that given in the National Formulary, page 75. As you are probably aware, there are several acetates of aluminum. The neutral salt $Al_2(C_2H_3O_2)_3$ is very soluble in water, and dries up in the vacuum of the air pump to a gummy mass without crystallizing. The solution obtained by decomposing aluminum sulphate, $Al_2(SO_4)_3$, with lead acetate may be supposed to contain neutral aluminum acetate, $Al_2(O_2C)_2$. This salt cannot, however, be obtained in the dry state. If the solution be rapidly evaporated at low temperature a basic soluble acetate is obtained, having the composition $Al_2O_3 \cdot 2C_2H_3O_2 \cdot 4H_2O$ (Crum). But if the solution be left to stand in the cold, or submitted to the action of heat, insoluble basic salts are formed. The soluble aluminum acetate when exposed in a dilute solution to the temperature of boiling water for several days, undergoes a very remarkable change, the whole of the acetic acid being expelled by the action of the heat, and a peculiar soluble modification of alumina remaining in the solution. The N. F. preparation, noted above, is practically identical with the Liquor Aluminii Acetici of the German Pharmacopoeia, and contains from 7.5 to 8 per cent. of basic aluminum acetate.

Acetate of aluminum resembles alum in its general astringent action, contracting the tissues and restraining secretions. Burrow and others have found it admirably adapted as a preservative agent, as in embalming, and it has been used to deodorize fetid secretions of sweat, pus, mucus, etc. For external use a 3 per cent. solution is the strongest which is required, as given by the following formula of V. Bruns, of Tübingen:

Alum	72 parts
Acetate of lead	115 parts
Water	1000 parts

Mix and filter.

For irrigation purposes this 3 per cent. solution may be diluted by from 3 to 6 volumes of water, giving a 1 to 0.5 per cent. solution. A preparation which is reported to possess analogous properties is Solution of Aluminium Acetico-Tartrate of the N. F.

Some years ago the Jour. de Pharm. d'Anvers published the following process, in which calcium carbonate is used instead of lead acetate: Dissolve 30 parts of aluminum sulphate in 60 parts of distilled water, and add 36 parts of acetic acid dilute. Mix 13 parts of calcium carbonate with 20 parts of water, and add the mixture to the solution first made, under constant stirring. In order to ensure the presence of all the calcium carbonate, rinse the vessel in which the mixture was made, and add the water to the solution. Let the whole stand for twenty-four hours with an occasional agitation, or until it is absolutely certain that all free carbonic acid has escaped, and then weigh the liquid, and, if necessary, add sufficient water to make a total of 171.50 parts.

ZINC PLASTER.

(1) Lead plaster	432 parts
Yellow wax	242 parts
Lanolin-caoutchouc	1800 parts
Zinc oxide	276 parts

Lanolin-caoutchouc is prepared by mixing 1650 parts of lanolin with 150 parts of caoutchouc dissolved in chloroform and distilling off the chloroform.

(2) Vasoline	100 parts
Yellow wax	100 parts
Solution of caoutchouc (1:10)	100 parts
Zinc oxide	30 parts

The solvent for the rubber is evaporated off. (Reveré Ph.)

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, FEBRUARY 24, 1898.

No. 8.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates:
U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483, NEW YORK.
Cable Address: "ERA"—New York.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL.....	277
Liquefaction of Air.....	280
Art Treasures in a Pharmacy School.....	280
ERA CORRESPONDENCE.....	281
First Aid to the Injured.....	281
Botany.....	285
Physiological Effects of Mental Work.....	288
Comparing Toxin Production of Different Cultures.....	290
PHARMACY.....	292
QUESTION BOX.....	293
NEWS AND TRADE DEPARTMENT.....	297
MENT.....	297
John H. Masch.....	297
Look Out for the Swindlers.....	297
Telephones in Washington.....	297
Protests Against Changes in Pharmacy Bill.....	298
New York Merchants Looking Out.....	298
Counterfeiters Punished.....	298
Hearing on Shorter Hours Bill.....	299
Move Against Cutters.....	299
Drug Trade Section.....	299
Eureka Chemical Co.....	299
Not Playing Possum.....	300
State Pharmacy Law Drawn Out.....	300
News Letters.....	301
OBITUARY.....	307
BUSINESS RECORD.....	308
Pharmacy in Australasia.....	309
State of Trade.....	311
Market Report.....	312
PATENTS, ETC.....	312

"The British and Colonial Druggist," London.

Subscriptions and advertisements for this weekly drug journal will be received and forwarded through this office. Specimen copies and schedule of rates will be furnished upon application.

THE ERA DOSE BOOK.

Rapidity in prescription work is a recognized qualification in the dispenser, so much so that appliances and apparatus are continually sought for to facilitate speed. There is, however, another factor concerned in producing this desired result, viz., mental speed or quickness, and it also needs help in the way of labor-saving appliances. For instance, there are many things which cannot be trusted to memory without endangering accuracy, and the means for reference to these things should be just as handy and convenient as the other aids in dispensing. Nothing so well meets this requirement of mental speed in dispensing as the Era Dose Book. The most essential points in prescription work are condensed within it. The proper dosage of drugs and chemicals is indicated, and questions as to percentage, solubility, compatibility, dose equivalents, meanings of Latin, French and German terms, etc., etc., are answered at a glance. Whatever may be the other conveniences of the prescription department, there is need of a work of this kind and the Era Dose Book at 50 cents a copy supplies it most acceptably and economically.

The Trade-Mark Problem and the Substitution Question.

If the true nature of a trade-mark were better understood, and if trade-marks received, as they should, just that recognition they deserve and no more, there would be little or no complaint of substitution, as now indiscriminately made by some manufacturers of proprietary preparations. There are certain vital principles governing the law of patents and trade-marks, but confusion and error have crept in through misapplication and misunderstanding of these principles. Manufacturers have attempted, often ignorantly, sometimes purposely, to claim for their trade-marks greater protection than was their due. It is very desirable that some means be devised whereby the exact limit of ownership in trade-marks may be designated and fully understood by all. Trade-marks are a most valuable business property, and every owner of a trade-mark has a right to expect the protection of it. Associations of manufacturers and dealers could do no better work for themselves than to throw a little light upon this matter, and establish in public appreciation, and in their own understanding as well, a better comprehension of what a trade-mark is and what it does and gives.

Every medicine, simple or compound (or article of any sort) must necessarily have a name by which the public may recognize and describe it when buying it. He who offers another article under the same name or a similar name is guilty of deception. It is, however, legitimate competition to offer another brand of the same article under its proper name, if one possesses the knowledge required to duplicate it, and if the article is not patented; and, farther, it is also legitimate competition to offer in place thereof, or as a substitute thereof, some other article of unlike name, label and package. The name which the public uses to describe an article in purchasing it cannot be a trade-mark, for it is obviously impossible that the name used to distinguish one thing from another can at the same time be used to distinguish between two or more brands of the same thing. The trade-mark simply distinguishes between brands, but is not applied to the article itself.

When an article is patented, however, its name and product, is restrained from general use for seventeen years, but exact knowledge concerning it, by which anyone can duplicate it at any time for experimental purposes, is filed at the Patent Office, and is on sale for a few cents. After the patent expires both product and name are free to the use of the public.

Reduced to its lowest terms the trade-mark and patent question is very simple and easy of comprehension. For a patent its holder receives protection for a certain named term of years. For a trade-mark he receives virtually perpetual protection, not on the article itself, but upon his own brand thereof. Protection by both patent and trade-mark is illogical and impossible, or, rather, when one (the patent) expires, the other does likewise.

A Journalistic Swan Song.

Levity and merriment are usually out of place at a funeral, but our esteemed ex-contemporary, The Pharmaceutical Digest, of Portland, Ore., did itself proud at its funeral which occurred upon Dec. 31, 1897, or thereabouts.

Our natural grief at the untimely occurrence is, however, mitigated by the rare humor and spirit of resignation injected into the last issue of the expiring journal by editor Dietrich. He tells his story as follows: "The Pharmaceutical Digest has been shown favor not accorded to humanity in general. Its fate was decided upon six months ago, and for that length of time it has had the unusual privilege of preparing for its dissolution. Certainly it ought to be prepared to die, and it is, and it dies gracefully, you bet. During these six months it has worked the advertising proposition 'to a finish,' and the results are before you. It is possible that receipts will cover disbursements. This is flattering and fills our soul with joy and our shoes with feet. The end has come and from this time on we are no more, but we have been strengthened during these closing moments of our literary existence with the assurance that our readers will bear up bravely under the affliction. Who knows but that this bereavement may prove a blessing in disguise? Cheer up! Dear friends! Don't be downhearted! Time will cure the wound caused by this untimely passing away and in the springtime, Gentle Annie, you will be happy as of old. Farewell! Pharmaceutical Digest! Farewell!"

A Professional Advertising Scheme.

Every once in a while we hear of plain druggist So-and-So making a speech or delivering an address upon some scientific matter before an association of his brethren, or gathering of his alumni. Such things are not frequent enough to call for note as characteristics of the fraternity, but they show some pleasing possibilities.

The druggist knows a whole lot of scientific things, but the public hardly gives him due credit. In his struggle for professional recognition the druggist is convinced within his heart that if he had opportunity to engage the public ear long enough for a statement of his accomplishments much of his struggle would be over. He would be "recognized" along with the doctor, the lawyer and the minister. The reputation of these latter gentlemen has been built up through centuries of advertising. We say "advertising" advisedly. The public prints and libraries recount their deeds and accomplishments, and words of mouth fill the air with recommendations. Although the professions are outwardly averse to the usual commercial form of advertising, there are other means to the great end. One of these is the rostrum. Every community which makes any pretensions to smartness has its literary and debating societies for alleged mental improvement, and to these the doctors of law, medicine and divinity are duly bidden to deliver platitudes upon moral and social topics, and all this time the "common chemist of the common people" sits in a corner with his tongue under restraint, fuming and fretting as he thinks of the interesting things he might tell people, or the wonderful things which he might demonstrate with a little chlorate of potash and sulphur.

This is too bad, but the druggist is to blame for the badness. He hasn't pushed himself to the front in this advertising scheme. He is still waiting to be pulled before the footlights, but nobody seems to care to help him to the front. There is no way to have this thing done but by doing it himself. He must deliberately lay his wires like his other professional friends to get himself "invited" to appear before the people. He must make the opportunity to appear before the literary society or the mental culture club, by delicately conveying the assurance that he can relieve the usual dullness with a little talk on the wonders of chemistry, and can promise some illustrative experiments, guaranteed to keep the most somnolent members awake. Then there is the Friday afternoon in the public schools. Professional gentlemen are frequently invited to fill the youthful mind with commonplace truths by making short addresses. Here is opportunity for the druggist to perform some

chemical wonders which would be relished by the youngsters as much as a sleight-of-hand performance.

There is another thing to be done after the druggist has made up his mind that the clam is no longer a worthy example. This is to make sure that the newspapers are well informed of his debut as a lecturer or talker. The editor may begrudge the space he is compelled to give to the remarks of the honorables, the reverends and the doctors before the literary society or the school children, for these worthy people bring no advertising grist to his mill. With the druggist it is different. He is a recognized advertiser whose good will is to be flattered and cultivated. When he gives a talk on "Quinine" or "Hydrogen" before a gathering of his fellow townsmen the occasion is worthy of a half column or so in the local paper. And it will do the worthy pharmacist a world of good. He will be "professional" before he knows it. His skill will be heralded far and wide, and it will be surely inferred that a man with his rare scientific attainments is a most competent person to fill prescriptions.

Saving Waste Products.

Attention has been called to the enormous waste of valuable material which is going on continually in the great copper furnaces of Western mining towns. It is estimated that in the burning of ores in the furnaces of one town only, which is named, some 350 tons of volatilized sulphur are poured into the atmosphere daily. The effect of this great quantity of poisonous vapor is the almost total destruction of all vegetation in and around the city. Taking the amount named as a basis of computation, we are told that the annual waste of sulphur reaches the great total of 128,000 tons, which at the ruling price for sulphur amounts to a most respectable sum. We are not in a position to verify these assertions, nor to estimate even approximately the total waste of sulphur in all the mining operations of the country, nor, what is a far greater task, of computing the waste in all other sorts of industrial operations. We do know, however, that manufacturers are continually striving by all means to prevent such waste of by-products, and to save them as a material source of profit. The question always to be considered is whether this can be done at a profit. We are not surprised, therefore, to learn that managers of the reduction works of the West are investigating with a view to saving this enormous amount of sulphur through some financially profitable operation.

Credit.

Good credit is a better possession to the merchant than a reputation for cash payments. All know what credit is, but few can define it. In a recent address by a St. Paul merchant he used these words, which are perhaps as correct and comprehensive an effort at definition as can be made:

Webster defines credit as "Good opinion founded on a belief in a man's veracity, integrity, ability and virtue." You will observe that the elements which enter into the constitution of credit are manifold. It is not veracity alone, or the telling of the truth. Neither is it honesty alone, nor ability alone, nor virtue alone. It is the combination of all of these which constitutes credit. Let any one of the elements be lacking, and the structure is not complete.

Were I asked to place in their relative position those different principles which enter into the constitution of credit, I should put above all others that of honesty, the ability to discern and to do the right and to tell the truth. Next I should place ability, natural or acquired, the capacity properly to use the powers with which we have been endowed and to make the best use of the opportunities that come to us. The young man who has ability and honesty is never long in want of a situation, and never fails to rise in the world. At the bottom of the list I should place capital.

Merchants should hold credit as their most valuable possession, and guard it carefully.

Is There a Chance for Young Chemists?

A young man, a pharmacy graduate, who says he has had experience in manufacturing work, asks what chance he would stand of getting employment as a chemist in the Southern States.

We cannot tell him. Positions as chemists in any line of investigation depend upon the law of supply and demand. The successful manufacturing chemist of today is wholly a specialist, and manufacturers are always on the lookout for men qualified in their particular lines. Specializing is the order of the day, and if our young friend has prepared himself for any particular line of work he should have no difficulty in getting a chance in the Southern States, or anywhere else. We should like to hear from our readers upon this subject. Give the young man a chance.

Way Off.

Our esteemed English contemporary, the British and Colonial Druggist, chronicles the fact that "a terrible disaster occurred at Seattle, near New York, last week." New York is a big city, next to London, in fact, but it cannot consistently consider Seattle one of its suburbs, though Chicago might claim it. New York is about half way between London and Seattle. This is a big country, and it requires nearly a week of rapid railroad traveling from New York to reach that thriving city on Puget Sound.

Borax is said to have more uses in industrial arts, in ordinary household economy, and in medicine, than any other single substance of familiar acquaintance, but, if we are to believe what has been recently stated, it is more of a treasure than it has commonly been held. News reports are to the effect that a San Francisco physician has prepared a paper to be read before the State Medical Society, in which he says that boracic acid, prepared from borax, is a cure for consumption. He takes the ground that boracic acid, used in the preparation of oxytuberculin, is really the only active principle in that preparation, and that it, not the tuberculin, kills the disease germs. He cites a large number of experiments, and describes many cases in which his boracic acid medicament was administered with startlingly satisfactory results. We are a little skeptical ourselves, however, concerning this new consumption cure.

The members of the Columbus, Ohio, Druggists' Association, met a few days ago and promptly resolved to fight the cutters in that town by becoming cutters themselves, and it was decided to get out a price list which will be distributed to each member of the organization. This action is all right enough, on the theory that the best way to fight the devil is with fire, but another determination of the society would seem to be rather inconsistent. Though the members are to become cutters they are not going to advertise. This merely helps the regular cutter along, who will take full advantage of the opportunity and advertise more aggressively than ever. If it is decided to drive him out of business, the druggists must be a little more lively in their tactics of warfare. How are the people to know of the cut price crusade if they are not told of it?

There is a druggist in Pennsylvania who intends to manifest his interest in Cuba and her suffering people by setting aside at the end of each month one per cent. of all the profits he derives from his business to the relief of Cuba and her patriots who are struggling to attain freedom. He is an ardent supporter of the Cuban cause, and believes in showing in an active and energetic manner the feelings he entertains. He believes it would be a great thing for Cuba if all his brother druggists would follow his example. So it would, if, and it is a big if, they made much profit in their business, but all of them do not.

There is great trouble in a certain section of Michigan, where four druggists in the little town of Charlotte have been arrested for selling liquor to students of Olivet College, situated a few miles distant. This college is a denominational institution, and its president has sworn out the warrants of arrest and claims that he possesses evidence that will positively convict the druggists of the offense charged. If it is proven that the druggists were guilty, they deserve no sympathy, but it is best to defer decision until the testimony of both sides is presented. There is such a thing as a distortion of facts in order to support malicious or fanatical charges. The persons named are reputable men, and their reputations are not to be taken away lightly.

The great apostle of prohibition, ex-Governor of Kansas, Hon. John P. St. John, signed a petition of a druggist in his home town who wanted legal authority to sell liquor for medicine. This action has stirred up a great fuss among the acquaintances of the prohibitionist, and St. John is condemned unmercifully and unsparingly. There are some people who cannot seem to realize that there is a legitimate as well as an illegitimate use for liquor. It is absolutely essential, particularly in prohibition or no-license localities, that some one person be allowed to keep liquor, for emergency uses, and that person is naturally the druggist. St. John was wholly within his right and duty, both as a citizen and an ardent prohibitionist.

A druggist in an Illinois town thinks he has a good thing in the shape of a telephone to replace his night bell. The instrument is placed outside the door, protected by a glass case. If you want to talk with the druggist you smash the glass, press a button three times, and he will answer. We can foresee trouble for this ingenious individual. There are people who are mean enough to smash the glass just for the fun of the thing, and such a habit as this is likely to prove expensive in the end.

Michigan has a small town in which A and B are in partnership in the retail drug business. A is a Republican, B a Democrat, and they have been alternately acting as Postmaster since 1882, changing about with every change in the administration. Four years ago A was dropped, now it is B's turn to mourn, for A has just been appointed to succeed him as Postmaster. But the post office stays right along in the same old corner of the drug store. This is a political arrangement which would be hard to beat.

A New Jersey newspaper writes that in one week there have come to the little town which it represents, three undertakers, five doctors and one druggist. In commenting upon this fact it naively says: "The general health of the town is excellent, and the coming of all these professional gentlemen, the druggist of course excepted, has caused considerable surprise." Just why the druggist is excepted is also a matter of surprise to us. Most people would see a very close connection between his business and the callings of the doctor and the undertaker.

Last week a couple of Brooklyn doctors announced that they had discovered an antitoxin which is a cure for pneumonia, and that they had tried it with success in a dozen cases. As is common to all stories of this nature, these doctors said that they had "been working patiently for years, and that the matter was still in an experimental stage," consequently they were not yet fully prepared to give the details thereof for publication. We are therefore compelled to possess our souls in patience, until we know more about this pneumonia antitoxin.

A new drug store was opened in a Montana town a few days ago, and the proprietor celebrated the occasion by handing each visitor a handsome valentine.

THE LIQUEFACTION OF AIR.

The economical liquefaction of air in large quantities has been recently accomplished by Mr. Charles E. Tripler, of New York, after several years of experimental work, says *Sci. Amer.* Two and a half gallons of the liquid were recently sent from his laboratory to Prof. Barker, of the University of Pennsylvania, and its properties were exhibited in an extremely interesting series of experiments during a lecture delivered by Prof. Barker to his class and a company of invited guests. This was the first public exhibition of the kind of this article in the United States.

The laws governing the existence of air in the liquid or gaseous state are the same as those for water—to take a substance with which we are most familiar. Above a certain temperature and pressure (212° F. and atmospheric pressure at the sea level) water exists as a vapor; from 212° F. to 32° F. at the same pressure it is a liquid, and below that temperature it is a solid. In its normal condition, air, as we know it, is a gas, just as in its normal condition water is a liquid; but if we lower the temperature or increase the pressure, or both, of air to a sufficient degree, we reach a point at which condensation takes place. The liquefaction point of air under normal atmospheric pressure is 311.8° below zero by the Fahrenheit scale.

Mr. Tripler's method of liquefaction is based upon the fact that if a gas be compressed and allowed suddenly to expand it absorbs the heat of the surrounding medium, thereby producing intense cold. He compresses air to 2,000 pounds to the square inch, passes it through a coil and permits it to issue from a needle point orifice. There it expands and cools. This cold stream of air circulates around a second coil through which compressed air is flowing, reducing the temperature of the latter. The air issuing from this second coil has its temperature lowered to a point due to its own expansion, plus the cold imparted from the first expansion. The expanded and extremely cold air from the second coil is used similarly to cool a third coil, the air in which is brought down to a temperature of -311.8° F. and below, at which it condenses and flows from the end of the coil in a liquid stream.

In the course of his lecture Prof. Barker made a number of curious experiments with the liquid, illustrating the operation of the laws governing the formation of solids, liquids and gases. When the liquid was poured into a tumbler it boiled until it had absorbed the heat of the glass. The cold gas given off condensed the moisture in the air above the glass, which fell in the form of hoar frost. A piece of tin thrust into the liquid made it boil and the tin was rendered as brittle as glass. Copper and platinum were not so affected, and it is evident that these metals will make suitable receptacles for this new liquid. When it was boiled over a furnace the ebullition was, of course, excessive; but the moment water was poured into the boiling liquid, the former was instantly frozen. Alcohol and mercury were frozen when brought in contact with the new product. The liquefaction point of the two constituents of air is different, that of oxygen for given pressures being several degrees higher than that of nitrogen. Hence, as the temperature of the liquid rises, the nitrogen is the first to escape as a gas. The remaining liquid is proportionately rich in oxygen—a fact which is proved by the bluish tint which a standing vessel of the liquid assumes if exposed to the air. Just what the economic value of this new and extremely interesting product is, time will show; but in experimental work in the laboratory it will be certain to find a ready field of usefulness.

ART TREASURES IN A PHARMACY SCHOOL.

The Paris correspondent of the Boston Transcript writes very entertainingly of art matters in the French capital, and describes at some length certain treasures of decoration in the College of Pharmacy. He says:

"Albert Besnard is without doubt, next to Puvion de la cloche, cold applications to the head, heat to the d'ouvre being the long central hall of the Ecole de Pharmacie. It is unfortunate that this is not more generally known, for this school on the avenue de l'Observatoire near the Luxembourg gardens is passed by many American art students going to their studios near by and by American sightseers as well, little dreaming of the wealth of art it contains. These Pharmacie panels were the first of Besnard's mural work and were done ten or fifteen years ago. They were painted on the walls themselves, but as they were badly prepared the plaster is beginning to crumble in places. It seems to be now too late to do anything to preserve them, and before long it will be the sad fate of the Parisians, always lovers and appreciators of good art, to see one of their masterpieces slowly disappearing through carelessness. These represent geology and botany, one of the panels showing a party of men searching on a mountain side for geological specimens. These men are in modern costume, which, instead of appearing inartistic, as is usually the case, has been handled in such a simple and clever way as to be very decorative. The composition is of long and sweeping lines, those of the mountains, and also of the swaying row of searchers coming down the center of the panel into the foreground, while the shadows on the snow and the distant mountains and sky make a color scheme of cold blue. The panel next to this is geology indoors, a professor lecturing to a crowd of students. Uncompromising as the subject appears, he has surmounted all difficulties and one finds a very original but exceedingly decorative bit of wall. Opposite are the two botany panels, very much the same in idea, but showing great variety in composition. Again there is a lecture hall with master and pupils, and again an expedition out of doors, this time in the woods in search of flowers.

"Along the length of the hall are windows on each side and under these are five long panels, where Besnard has let his imagination have full play. These represent earth in the prehistoric ages, but the subject is thought little of, 'tis but an excuse for wonderful and weird costumes of color and composition. In one there is seen a herd of wild horses dashing up a hillside in the foreground, lifting high their heads in air and snorting with fright as they see in the distance a few specimens of the early man. The audacity of the composition, and the sweeping, moving lines are marvelous in their freedom and strength. Another one, especially beautiful for its color scheme is of the ocean with sea serpents, one on the crest of a huge swelling wave, the sea and sky of transparent, opalescent greens. Though all of the panels are very different, they harmonize perfectly, and with four more large pictures at the other end of the hall form a decorative whole which has not been equaled by any but Puvion.

A couple of very interesting items of news have just come to notice. In a Connecticut drug store a customer found nearly \$100 on the floor, and out in Ohio a drug clerk has been sued for \$130 board for his horses. In the first case the query arises, how did the druggist overlook such a sum in his store, and in the second instance the problem is, how did a clerk become able to purchase trotting horses? We leave the solutions of these questions to those better able to grapple them.

One of the most foolish and senseless instances of imitation of an advertised preparation has just been exposed in a so-styled "Tonic in your throat."

A young man in Iowa was killed while under the influence of liquor, and his mother has brought suit for \$10,000 against the druggists of the town of Humboldt who sold him the liquor.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.
 Virgil Coblentz, A.M., Ph.M., Ph.D., F.C.S.
 Wilbur G. Compher, A. M., M. D.
 Albert E. Ebert, Ph.M., Ph.D.
 James M. Good, Ph.G., M.D., Arthur L. Green, M.D., Ph.D., Ph.C.
 Charles F. Heebner, Ph.M.B., Ph.G.
 George B. Kauffman, B.Sc., Ph.D.
 E. J. Kennedy, Ph.C.
 Henry Kraemer, Ph.G., Ph.D.
 Edward Kremers, Ph.G., Ph.D.
 John Uri Lloyd, Ph.M., Ph.D.
 Oscar Oldberg, Ph.D.
 Charles W. Parsons, Ph.C.
 Edgar L. Patch, Ph.G.
 George F. Payne, Ph.G., M.D.
 T. D. Reed, M.D., C.M.
 Edsel A. Ruddiman, Ph.M., M.D.
 Henry H. Rusby, M.D.
 L. E. Sayre, B.S., Ph.M.
 Wilbur L. Scoville, Ph.G.
 William Simon, Ph.D., M.D.
 F. E. Stewart, M.D., Ph.G.
 Julius W. Sturmer, Ph.G.
 Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as an auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 47.

First Aids to the Injured.—Concluded.

By STEWART LEROY McCURDY, A.M., M.D.

Professor of Anatomy and Oral Surgery, Pittsburg Dental College;

Dean of Pittsburg School of Anatomy; Orthopedic Surgeon to Presbyterian Hospital, Pittsburg, Etc.

PART III.

BURNS—SCALDS.

Burns from a flame or acid, or scalds, are dangerous if two-fifths of the surface of the body is involved, and when more than this amount of skin is involved the result is usually death. Less amount of surface than this may terminate fatally when the deep structures are involved or when steam has been inhaled.

When the clothing is aflame the unfortunate should be forced to lie down and a blanket, coat, carpet or some fabric large enough to envelop the body thrown around him. *Everything must be done to keep the flames away from the face so that the hot air will not enter the lungs.*

After the flame is extinguished, the burned clothing should be carefully removed and the burned surface exposed so that a dressing may be immediately applied to protect the raw surfaces from the air, and thus prevent pain and consequent shock. Blisters should be punctured near the margin so that the liquid may escape, and allow the epidermis to collapse. This epidermis affords protection and should never be torn away during the early stage.

The best dressing is carron oil (linseed oil and lime water, equal parts) applied to the exposed surface by saturating gauze or soft muslin. Over this cotton batting should be wrapped, and this dressing held in position with a bandage.

The pain and shock are proportionate to the amount of surface destroyed, and these conditions increase as treatment is delayed.

The first idea of treatment is to make a substitute for the destroyed epidermis at the earliest possible moment.

Solutions of baking soda, sweet oil, castor oil, vaseline, lanolin, etc., make good dressings and should be applied as directed above. Gauze or flannel immersed in hot water is an excellent dressing. Stimulants to keep the patient up, and opiates in proper doses, should be administered as may be necessary.

Acids, as vitriol, produce a painful variety of injury, which should immediately be given a bath of soda or soapsuds, and, after cleansing in hot water, should be dressed as other burns.

Alkalies produce an injury similar to the foregoing and require similar treatment, except that vinegar or other mild acid solutions should be applied immediately after the accident.

Burns from gunpowder are treated by first cleansing the parts with hot water, and with a towel or sponge briskly rubbing the skin to dislodge the particles of powder not too deeply imbedded. The removal of the deep particles should be done by a physician, but if he cannot readily be found, others may remove them with a sharp needle, which should be sterilized by passing it through a flame, or immersing in hot water or alcohol.

Frost bite and freezing are of frequent occurrence in country districts, and with railroad and street car employees.

The treatment consists in rubbing the parts. The practice of using ice, snow, or ice water is all right, but it is the friction which benefits, whether it is made with ice or with the hand.

Temperature should be gradually elevated. When an individual is frozen to stupor, or unconsciousness, friction and gradual elevation of the temperature of the room, with stimulants and artificial respiration, are the means most likely to restore life. A bath, with the water just slightly warmed and the temperature very gradually elevated, should be resorted to if necessary, after which the patient should be wrapped in warm blankets.

FRACTURES OF SKULL OR INJURIES OF BRAIN.

Fracture of the skull or injuries to the brain, resulting in concussion or compression, have for symptoms incoherent talking, stupor from which they may be aroused, or the patient may be unconscious. In fracture of the

skull with compression there will be profound stupor, irregular breathing, irregularly contracted pupils, and possibly paralysis of one or more extremities.

In Concussion, or where there is a simple shaking up of the brain, the impression is not so great, it usually being possible to arouse the patient sufficiently for him to respond to questions.

The history of an injury, as a fall or a blow, will assist in making a diagnosis.

The Treatment, until the surgeon arrives, is absolute quiet in recumbency, no whisky or alcohol stimulants, cold may be applied to the head, and water to drink, if the patient desires or can take it.

FOREIGN BODIES.

Foreign bodies in the Eye may be removed with a silk handkerchief. The lid may be inverted by asking the patient to look down while the lid is grasped between the thumb and index finger of one hand. While the central part of the lid is pushed down with the end of a lead pencil, or with the tip of a finger, the lid is turned up. (Fig. 4.) This exposes the under surface of the lid, where the foreign body is usually found. When the foreign body is on the cornea (or ball) if it cannot be readily removed with a handkerchief or some blunt instrument the doctor's services should be sought. Solution of cocaine (4 per cent.) should be dropped in the eye, and impalpable boracic acid dusted in afterwards.

Fig. 4.—Turning up Eye-lid (after Dulles).

Foreign bodies in the Nose are usually pushed farther in, unless the effort at removal is made with a flat, blunt instrument, as a bodkin needle, entered above the object. The hand is then elevated, which draws the object downward and forward and usually out. Unless cool-headed system can be observed, no effort should be made at removal, as no injury can be done from a bean, grain of corn, button, etc., remaining in the nose for some hours, and indeed I have known a shoe button to remain in the nose for three weeks without doing harm.

Foreign bodies in the Throat are accidents, as a rule, of childhood, and must be removed at once. From the throat foreign bodies may pass down the gullet (esophagus) into the stomach, or through the windpipe (larynx and trachea) into the lungs.

Bodies, as fish bones, may lodge in a membranous fold at one side of the base of the tongue. They may be removed with the finger, or better with forceps, after the tongue is depressed with a spoon handle. If the objects go below this point into the gullet, specially devised instruments are required for their removal, or to force digestible objects into the stomach. A parachute probang with ribs made of whalebone, chain and bristle is used by surgeons for the removal of these bodies. It is passed down alongside and below the object, when it can be opened, and withdrawn, and along with it usually comes the body entangled in the bristles.

Round bodies, as bones when not too large, and coins, may be pushed into the stomach, where they do no harm and pass off in a few days. Sharp objects, as fish hooks, hat pins, and sharp-pointed instruments must be removed at all hazard, and little attempt must be made by any one but the physician, and all haste must be made to get him.

Instances are reported where false teeth, table fork and a hat pin have been removed from the stomach or low down in the gullet by cutting directly down into the abdomen, the patient usually making a good recovery.

When the objects pass into the Windpipe a most serious condition is present. Grains of corn, beans, buttons, etc., when they enter the windpipe are drawn into the lungs by the first breath and may occlude one entire

lung, resulting in almost instant death. Suddenly turning the patient head downwards and striking the back may dislodge and throw the body off.

This condition will be recognized by the extreme difficulty of breathing. When bodies are retained in the windpipe any length of time they produce a dropsy of the mucous membrane, which greatly complicates matters, hence the desirability of immediate removal. The doctor should be summoned at once, and he must be informed as to the condition, and be prepared to perform tracheotomy (or opening the windpipe through the throat) in order that the object may be removed.

Foreign bodies in the Ear do little damage, indeed they do less damage if left alone than is caused by an unskillful effort at removal, as it is not an unusual accident to injure the ear drum by pushing the object in against it. Unless easily removed the physician should be called upon.

BANDAGING.

For convenience of application and to accomplish special purposes, bandages are made in rolls, triangles and squares. Four-tailed or many tailed bandages are of service in certain cases.

The ordinary roller bandage is of most universal service and is made from cheap muslin, or of old sheets or bolster cases.

In applying a bandage the roll must be taken in the right hand, the back of the bandage held to the skin with the left thumb resting on the end. Begin bandag-



Fig. 5.—Bandaging Hand and Arm. (After Dulles.)

ing at the toes or at the fingers and go toward the body. (Figs. 5-6.) Never bandage an extremity from the body. Circular turns should be made and the turns reversed where the extremity is conical so that the edge will not cut into the skin, but instead the pressure will be uniform. This is known as a spiral reversed bandage or spica. Figure of 8 turns should be made over the joints, as the knee and elbow. The foregoing rules may be observed for the extremities.



Fig. 6.—Bandaging Foot and Leg. (After Dulles.)

ing. This is repeated, wrapping the layers about half the width of the bandage until the shoulder is covered.

For the hip the bandage is applied in the same way, except the bandage goes around the pelvis.

The triangle is a most convenient bandage and can be made more readily, since smaller portions of muslin are necessary and an ordinary handkerchief serves well. The triangle serves best for the head, neck, shoulder, hip or other joints, but where even pressure is desired the roller is best.

A four-tailed bandage is used for the chin most frequently. Many tailed bandages are used to bandage the abdomen or thorax, and are used by applying the belly of the bandage in front, crossing the tails in the back and bringing them forward, where they are tied or pinned.

MEDICAL OR GENERAL EMERGENCIES.

(a) Unconsciousness may occur as follows: Coma, or insensibility, allied to sleep, from which the individual can be only partially aroused and may be due to inhalation of gas and known as Asphyxia, or to drugs, as whiskey and opium, and known as Intoxication. In all of these cases the pupils are dilated, the pulse strong and the face flushed.

Treatment consists in quiet, reclining position and cold to the head. In suffocation from gas use artificial respiration.

Syncope is loss of consciousness due to temporary heart inactivity, and is commonly called a "faint." Diminished heart action reduces the supply of blood to the brain, and thus produces the unconsciousness. Grief, sudden frights, emotions, debilitating conditions, starvation, the effects of drugs, are some of the causes. The face and hands are pale, the pulse weak, and the heart-beat may be almost imperceptible.

Treatment consists in placing the patient on the back in a quiet position, with plenty of fresh air. Do not elevate the head. Loosen the clothing, bathe the face with cold water, give inhalation of camphor or ammonia. Internally administer cold water, coffee, or when there can be no question as to the causes, brandy may be given.

Hysteria, a condition found in women, is, generally, an unconsciousness from which the patient can usually be aroused, but the condition is again assumed. Spasms, fits and convulsions may be associates. Conditions of pulse, skin, heart and pupils are normal.

Treatment consists in free use of cold water sprinkled or dashed in the face. This does no harm to any condition, and when hysteria is suspected this treatment should be carried out.

Epileptic fits come on suddenly and are manifested by convulsive seizures, falling, etc. The history of the case will assist in making a diagnosis, since these fits come on at regular intervals. Emergency treatment is to take care of the patient until the convulsion passes off and consciousness returns.

Apoplexy means a rupture of a blood vessel in the brain, the escaping blood causing pressure on the brain structure. Loss of consciousness, paralysis of half the body, or of an extremity, or of a group of muscles immediately follows. Breathing may be stertorous or noisy, face red and pulse slow. Pupils are generally of unequal size and one may not respond to the light.

Treatment consists in quiet, horizontal position, loosen the clothing, cold applications to the head, heat to the feet and rectal injections of hot water.

Convulsions of children are generally due to high fever, teething, intestinal irritations, and are, as a rule, not dangerous. They are controlled by immersing the patient in a bath of hot water, friction to the extremities and body, with cold to the head. When they persist, chloroform should be given by inhalation, and bromides internally. Convulsions in children, however, may be a forerunner of meningitis, serious inflammation of the spinal cord or brain, and the physician should assume responsibility in all cases.

(b) Sunstroke is result of continued exposure to heat for some hours. It may result from exposure to artificial

heat, as with boiler cleaners, laundrymen and mill workers. Unconsciousness is a result. At first there is difficult breathing, pulse quick and strong, skin hot and dry, and in a short time these may be displaced by the opposite conditions.

Treatment consists in quiet, recumbency, friction to skin with camphor and a rough towel. Apply cold to the head at all stages. One attack predisposes to subsequent attacks and exposures should be avoided.

(c) Electricity.—Accidents resulting from the accidental taking of a current of high voltage render the patient unconscious, producing a temporary paralysis and a condition of profound shock.

Treatment consists in artificial respiration, cold to the head and face, heat to extremities, quiet and stimulants.

(d) Drowning may result from an inability to swim, or, in the case of old swimmers, from great muscular exertion in the water, along with the exposure of the brain to the heat of the sun, producing a condition akin to sunstroke or apoplexy, and loss of consciousness causes them to sink without a struggle. Immersion for half an hour argues against resuscitation, but when the victim is under less time than this, resuscitation must be tried. Apparently hopeless cases are occasionally restored, while it frequently occurs that people who have been under water but a few minutes cannot be restored to life. All cases should be given the benefit of treatment.

In drowning the lungs and right side of the heart become engorged with blood. The lung engorgement prevents the flow of blood to the left side of the heart, hence this side is comparatively empty. The lungs have little air in them.

The idea in treatment is to fill the lungs with air, and force the blood on through the left side of the heart. Restoration consists in cleansing the mouth of mucus with the finger, drawing the tongue forward, and restoring respiration.

On recovering the body from the water take up the methods of restoration as soon as a convenient place can be secured.

Rolling over a barrel is barbarous; but lifting the subject while lying on the face by seizing him about the middle, will be proper, because any water in the lungs will thus escape.

Pumping fresh air into the lungs by producing artificial breathing is what should be done, and when the blood begins to circulate, the lungs will resume the respiratory process spontaneously.

As the body is being taken from the water and on the way to a resting place (as every second of time is valuable) turn it on its face for a moment, lift it as described above, and insert the slightly curved forefinger into the mouth, backwards, depressing the tongue and thus letting out the accumulated water, mucus or other obstructions, slapping the back between the shoulders at the same time.



Fig. 7.—Sylvester's Method, First Position. (After Dulles.)

To produce artificial breathing most physicians prefer "Sylvester's Ready Method."

This consists, after the above suggestions have been

carried out, in placing the body on the back, pulling the tongue forward, which better favors the passage of air into the windpipe, and then drawing the arms away from the sides of the body and upward so as to meet over the head, by means of which the ribs are raised (chest expanded) by the muscles running from them to the arms near the shoulder. (Fig. 7.) A vacuum is thus created in the lungs, the air rushes in, and the blood is more or less purified by the passage of the impure gases out of it and into the air, and by the giving up by the air of a portion of its oxygen to the blood. The



Fig. 8.—Sylvester's Method, Second Position. (After Duttes.) arms are now brought down to the sides, and the elbows made to almost meet over what is called the "pit of the stomach." (Fig. 8.) This produces contraction of the walls of the chest, and expulsion of the impure air from the lungs.

These two movements constitute an act of respiration, and should be persisted in, without interruption, at the rate of about sixteen to the minute. In other words, each complete movement should occupy about four seconds, which is about the natural rate of respiration in health.

"Choke damp" is a dangerous gas which often accumulates in coal mines, wells, rats, old cellars or caverns. These places should never be entered until a lighted candle is let down into the lowest depths. If the flame is extinguished or burns very dimly, no one should go in until the foul air is removed. It lies at the bottom because it is too heavy to ascend. It is not so heavy, however, but that a strong current of common air will dislodge it. Try the candle again before you go in. For persons asphyxiated from inhaling the gas, strip instantly and dash cold water on them with some force, not on the face, but more particularly around the lungs, upon the chest. After trying this for a few minutes with no success, produce artificial respiration by Sylvester's method.

TRANSPORTATION OF THE INJURED.

No machine shop, mill works, railroad or places where men work and are liable to be injured, should be without stretchers and emergency supplies.

Stretchers may be cheaply and compactly constructed, and while they are not very frequently used, serve such a humane purpose when needed that the effort to have them at hand should be made.

When stretchers cannot be found the injured may be carried on a board, door, or an outside window shutter.

In cities the ambulance is always at hand, and in army life, well drilled "first aids" classes are ready to serve the unfortunate. In simple country life, such convenient systems are not at hand and more homely methods must be adopted.

When a stretcher or other litter cannot be had, the injured may be carried by three persons very well, all of whom must be on one side, so as to permit the passing through a door, as well as to allow the patient to be placed on a bed with ease. The first individual places his left arm under the head, neck and shoulders of the

injured person, and the right across the chest, grasping around under the patient's left arm. The second individual grasps around the left side of the patient's hips (the pelvis, not the thighs) with his right hand, and left hand around the right side. Allow the hands to go well around the pelvis so as to have a firm hold. The third individual supports the legs.

Two persons may carry the injured between them in a sitting position when the patient's condition will permit it. This may be done by making a seat with the outside arms upon which the patient sits, and a back with the internal, while his arms are thrown around the necks of the carriers.

Two may carry an individual when he cannot sit up, by allowing one to stand between the thighs facing the feet and grasping the thighs with the arm while a second is back of the injured reaches under his arms and locks his fingers across the thorax.

One individual may carry an injured man or unconscious person pick-a-back or in the arms as a child is carried, or across the shoulders or across one shoulder.

Temporary stretchers may be made by reversing an overcoat and buttoning it securely, the side bars, which may be guns, broom sticks, clothes props, or what not, are run through the sleeves.

SURGICAL EMERGENCY BOX.

In mills, machine shops, factories, and in railroad, street car, and steamboat service a box containing the following should be placed where it may be of most service:

- 1 ounce absorbent cotton.
- $\frac{1}{2}$ dozen assorted bandages, 1, 2, 3 inches.
- 1 rubber tourniquet.
- 1 pyramid of pins.
- 1 dozen safety pins.
- 1 spool adhesive plaster, inch wide.
- 4 ounces carron oil (for burns).
- 1 ounce antiseptic solution.
- Bottle antiseptic tablets.
- Scissors.
- $\frac{1}{4}$ yard oiled muslin.

For methods of use see text (Treatment of Wounds).

MEDICAL EMERGENCY BOX.

Families which desire to be prepared to treat emergencies in the absence of the doctor or until he arrives may have a case containing the following:

1. 1 ounce Syrup of Ipecac to be used as an emetic, in cases of croup or poisoning. Dose 1 teaspoonful every ten minutes until effective.
2. Alum, in powder, $\frac{1}{2}$ teaspoonful as an emetic in poisoning or croup. Also used in hemorrhage from the stomach, lungs or nose.
3. Mustard, for plasters, for pain and to control sick stomach.
4. Castor oil, or epsom salts, or compound cathartic pills as a cathartic, the salts to be used when prompt action is desired.
5. Pargogire, for diarrhœa in children or to relieve pain. Dose from 5 drops, in child six months old, to one teaspoonful in adults, repeated every half hour until benefit is experienced.
6. Laudanum, for same as above, must be used with more caution and is to be given to adults rather than children, except when pargogire fails to relieve.
7. Lime water. As an antidote to acid poisoning, to be taken internally in large doses, as it can do little harm. With linseed, sweet, or castor oil it is the best dressing for burns or scalds.
8. Soda (taking soda) for acid poisoning internally or burns on surface.
9. Aromatic spirit of ammonia, for weakness, sickness, faintness, sick headache. Adult dose, 1 teaspoonful in water every ten to twenty minutes until benefit follows.
10. Whisky, or brandy, the ever-ready remedy, is of value when a very prompt stimulating action is demanded, and aromatic spirit of ammonia cannot be procured. In cases of suspected brain injury or apoplexy care should be exercised in its use, as intoxication may result and confuse the doctor in making a proper diagnosis.
11. Sweet spirit of nitre, used as diuretic and for fevers, 2 or 3 drop doses diluted in water to children to half teaspoonful to adults given every hour.

LECTURE No. 48.

Botany.—Concluded.

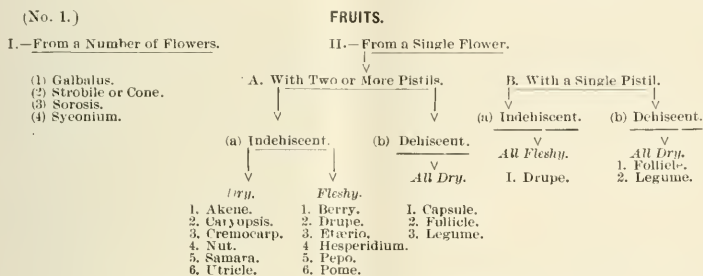
BY HENRY KRAEMER, PH. G., PH. D.

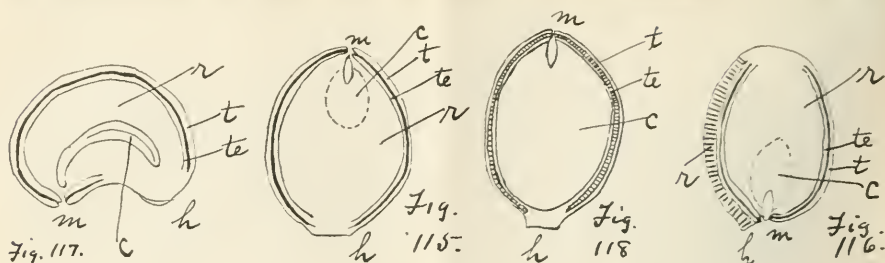
CLASSIFICATION OF FRUITS.—The Seed.

Fruits have been classified and studied according to various more or less artificial classifications. They may, for instance, be divided into groups that are the product of a single flower, or of the products of a number of flowers. Then those which are the product of a single flower may be subdivided into those that consist of one or more pistils. These then according to whether they are Dehiscent or Indehiscent—and these then as to whether they are dry or fleshy.

The seeds of certain plants are further distributed by reason of a mechanical dispersing arrangement in the fruit. According to E. Huth these fruits may be either Dry, Hygroscopic or Fleshy.

I.—Dry Fruits are of two kinds: (1) In which the fruits remain upon the plant, and (2) Those which are removed by means of prickles (being so-called "Burr Fruits"), which cause them to adhere to the skin or fur of animals. In the case of the fruit of Lappa (or Bur-





(2) The Pericarp may separate rather irregularly, as in the squirting cucumber (*Elatarium*).

(3) In other fruits (berries) the fruit is detached from the plant on striking a hard substance, and the seeds are ejected. There are nearly 50 genera with fruits in which the seeds are dispersed by some special mechanism. The distance to which seeds are discharged varies from 6 to 30 feet. The distance varies by day and by night. Huth has observed that by day the seeds of *Wistaria Sinensis* D. C. were ejected to a distance of 5 metres, whereas by night the distance was double this.

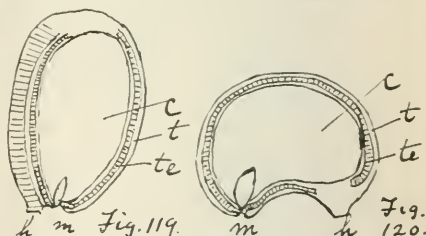
SEED.

The seed is the fertilized and developed ovule. It is this product for which each plant develops and lives. From one plant, as a rule, many seeds are produced. Each plant carries on its work of reproduction to such an extent that it is simply marvelous, when we consider the sum total of life. Linnæus has calculated that if an annual plant produced only two seeds—and there is possibly no plant so unproductive as this—and their seedlings next year produced two, and so on, then in 20 years there would be a million plants. The question is indeed appropriate, whence comes all this vital force? Can this geometrical ratio of increase continue? Darwin answers this problem as follows: "A struggle for existence inevitably follows from the high rate at which all organic beings tend to increase. Every being, which during its natural lifetime produces several eggs or seeds, must suffer destruction during some period of its life, and during some season or occasional year; otherwise on the principle of geometrical increase, its numbers would quickly become so inordinately great that no country could support the product. Hence as more individuals are produced than can possibly survive, there must in every case be a struggle for existence, either one individual with another of the same species, or with the individuals of distinct species, or with the physical conditions of life. It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms; for in this case, there can be no artificial increase of food, and no prudential restraint from marriage. Although some species may be now increasing, more or less rapidly, in numbers, all cannot do so, for the world would not hold them."

We have already seen that the embryo is the development from the fertilized egg-cell. Sometimes there is reserve material produced and stored in the embryo-sac or in the nucellus or in both. That reserve material which is formed and stored in the embryo-sac is called "Endosperm" to distinguish that which is formed outside of the embryo-sac and which is termed "Perisperm." They are both brought under the collective name of "Albumin" (Figs. 115-117). This term is misleading, however. In chemistry the term albumin is used to designate substances that have the composition of the white of the

egg, and are of a nitrogenous character. In the seed the so-called "albumin" consists of other than substances containing Nitrogen, as starch, oil, etc. A seed containing so-called "albumin" is said to be "albuminous" (Figs. 115-117). One without it is said to be "ex-albuminous" (Figs. 118-120). Among albuminous seeds may be mentioned *Nux Vomica*, *Castor Oil*, *Stramonium*, etc. Illustrations of ex-albuminous seeds are *Almond*, *Melon*, etc.

Seed Coats.—There have been equally great changes in the coats of the ovules. They are now the coats of the seed. Generally the two are distinguishable from each other, as in *Ricinus*, *Pepo*, etc. When there are two coats, the inner, as a rule, is light in color and of a delicate structure and is called "Tegmen" (or Endopleura). The outer coat is generally dark in color, rarely light (as in *Pepo*, *Melon*, etc.), and is firm in structure. This outer coat is called "Testa" (or Spermoderm or



Episperm). In some cases the two coats are united so closely that they are not easily to be distinguished.

Embryo.—The embryo develops a root and stem portion. The latter bears the rudimentary "seed leaves" or Cotyledons (Figs. 115-120). The number of the latter varies in two great classes of plants, viz., the Monocotyledons and the Dicotyledons. In the Monocotyledons, as oats, corn, colchicum, lily-of-the-valley, etc., there is but one cotyledon or seed-leaf. In the Dicotyledons, comprising much the larger proportion of plants of our temperate regions, the cotyledons are, as the name indicates, two in number.

The position of the tip of the root is always in the direction of the opening of the seed (Figs. 115-120). The opening of the ovule for the entrance of the pollen tube was termed foramen. In the seed it is more or less closed and is termed "Micropyle." The seed when ripe is detached from its stalk, and the scar left at this point of attachment is called the "Hilum," (sh).

The terms denoting the form of the ovule are still retained in describing the seed. The various classes of seeds may best be studied from illustrations in Figs. 115 to 120.

Fig. 115.—Orthotropous and albuminous.
Fig. 116.—Anatropous and albuminous.
Fig. 117.—Campylotropous and albuminous.
Fig. 118.—Orthotropous and ex-albuminous.
Fig. 119.—Anatropous and albuminous.
Fig. 120.—Campylotropous and ex-albuminous.

Figs. 115-120.—Diagrams of different kinds of seeds. (m) micropyle; (h) hilum; (t) outer coat or testa; (te) inner coat or tegmen; (c) cotyledons; (r) albumin or reserve.

PROTECTION AND DISPERSION OF SEEDS.

The outer seed coat possesses various colors, forms and appendages, as well as different kinds of constituents for the purpose of assisting the dispersal as well as protection of the seed. We have already seen how seeds are protected in many fruits, during the process of ripening, by producing spines, prickles, etc., and that even poisonous constituents are produced. In the plants of the *N. O.* Labiate (*Thymus*, etc.), the calyx persists on the fruit, forming a kind of protecting envelope. The mouth of the calyx tube is further provided with a large number of hairs which render the seeds inaccessible in some cases to small seed-devouring animals.

Many seeds are protected simply by the presence of a long stalk in the fruit. Cherries are protected from caterpillars by this means, as also are the pea pods from mice. Protection is afforded many seeds by the fruits secreting resinous or other substances distasteful to animals, as in the akene of the Hop (*Humulus Lupulus*), which is invested with "glandular hairs" or Lupulin. The scales of the pistillate flowers of Indian Hemp (*Cannabis sativa*) are agglutinated with a resinous exudation which serves to keep even the common sparrow from touching either this or the hop during the period of ripening.

Seeds need protection not only against the encroachments of animals, but also against injurious climatic influences. There are many seeds, as those contained in akenes, berries, etc., which are either closed in the pericarp or are imbedded in the succulent portions of the fruit and are not subjected to extremes of heat, etc. Other fruits, as Capsules, Strobiles, etc., discharge their seeds only during dry and warm weather, and the seeds have absolute immunity from too premature wetting, as in *Viola*, *Pinus*, etc.

In places where there is a long rainy, and a corresponding dry, season, seeds are especially protected against drought by the production in the fruit of an exceptional thick wall, as in the wooden Pear (*Xylomelum pyrifolium*).

Sometimes the plant utilizes its means of protection, sooner or later, also as a means for the dissemination of the seed. This is particularly true of the burr-like akenes of some of the plants of the *N. O.* Composite, etc. In case of Drupes, Pomes, Berries, the pericarp of the immature fruit is other than agreeable and tempting to animals. But when ripe the pericarp is not only attractive, but sought after by most animals and readily eaten, as in Cherry, Prune, Apple, Grape, etc.

In Cowhage (the hairs of the pods of *Mucuna fruriens*) we have secreting hairs which cover the exterior surface of the fruit, and during the ripening period thereof they secrete an irritating fluid. During this stage, if the fruits are touched by an animal there is caused an intense itching, or even eruption of the skin. It is said that no animal will dare touch these fruits during their ripening period. But after the seeds are ripe the hairs drop off and the fruit becomes succulent, and animals are no longer repulsed, but are on the other hand, attracted and devour the pulp with avidity, and disperse the indigestible seeds.

If seeds are to be dispersed by birds the fruit persists in the plant, for if they were to fall to the ground, little rodents would devour them. This is no doubt why Rose and Blackberry bushes possess persistent fruits, and why they are further armed with prickly stems which prevent the trespassing of little animals whose presence does the plant no good, but harm. Take the rose-hip, which is eagerly sought by black birds, etc. They, however, digest only the fleshy calyx and the akenes pass out undigested. They are by this means further carried to some place far distant from where the bush was located, and are not so likely to be eaten by the rodents, as in their new garb they are not so readily recognized by them.

We further see in the case of many plants of the *N. O.*

Rosaceæ which are provided with a more or less stony endocarp (as *Amygdala amara*, or bitter almond, etc.), that should a rodent or other animal open the putamen there is developed by the action of water a poisonous principle which would result in the death of the animal. Certain markings on seeds have no doubt something to do in causing their dissemination, as the peculiar mottling on the outer coat of castor-oil seeds.

Caruncle.—Sometimes appendages are developed after the fertilization of the ovule. The "wart-like" or "caruncle-like" protuberance arising at the hilum or micropyle portion of the seed, as in *Viola*, Castor-oil (Fig. 121), etc., is called a "Caruncle." This term may easily be remembered if we drop the "b" of caruncle.

Strophiole.—In some cases the protuberance arises at the chalaza (so called basal end) of the seed. It is then termed a Strophiole. The appendage, instead of remaining as a mere protuberance, may become keel-shaped or wing-like, and extend along the whole side of the seed, as along the raphe in *Sanguinaria*.

Arillus.—In a number of fruits the appendage completely envelopes the seed. It may be membranaceous or fleshy:

- (a) Membranaceous, as in Water-Lily (Species of *Nymphaea*).
- (b) Fleshy, as in May-Apple (*Podophyllum peltatum*) and Nutmeg.

It may have its origin either like the caruncle or strophiole, and it receives two distinctive names accordingly.

(a) True Arillus or Aril.—If its origin is at the chalaza end of the seed. This term was first employed by Linnaeus and afterwards was well defined by Gaertner.

(b) False Arillus or Arillode.—In the Nutmeg (Fig. 122), *Euonymus*, etc., the origin of the appendage is at the apex of the seed (Caruncle), whence the name given by Planchon is used, viz., Arillode or False Arillus. In Nutmeg the arillode forms the Mace of commerce.

The wind sometimes assists in the dissemination of seeds. Seeds which are thus disseminated are usually light in weight and small. They are further provided with either hair-like or wing-like appendages.

(1) Hairs are found upon seeds of cotton, milkweed, etc.

(2) Wings are found on seeds of *Catalpa*, etc.

UNFERTILIZED SEEDS.

It is well known that individuals (both in the plant and in the animal kingdom) may arise from unfertilized eggs. In the animal kingdom among plant lice (Aphids) and silk-worm moths, larvae arise from unfertilized eggs, and their pupae give rise only to females. In the vegetable kingdom, similar observations were made as early as the present century on rather low aquatic plants. One of the charas is found only in the brackish waters near the sea of the old world. It is a dioecious plant, but the male and female plants are seldom associated in the same waters. In fact, male plants are found in but a few restricted localities. In the North Baltic region male plants are never found. Female plants only occur. The egg cells are unfertilized, and yet without any stimulus from the male element the spores (corresponding to the seed of phanerogams) germinate in the spring and produce new plants. Similar and as notable cases occur frequently in the lower orders of plants.

Not only among the lower plants but also among higher plants has the unfertilized egg-cell produced, just as the fertilized ovule, a new individual. One of the everlasting of the Alps (*Gnaphalium alpinum*) possesses only pistillate flowers. The akenes nevertheless contain good seeds, and upon germinating develop plants similar to the parent. Other cases might be cited, as *Mercurialis annua*, of Central Europe, and *Coleobryne iticifolia* of Australia.

Parthenogenesis.—This development of a new individual from the unfertilized female egg cell is called "Parthenogenesis." A peculiarity of Parthenogenesis is that



Fig. 121.—Castor oil seed. (c) caruncle; (r) raphe.



the individual produced by an unfertilized seed is just like that produced by a fertilized seed.

There are cases that arise in nature which make this one of the most interesting and difficult problems we meet. In *Allium odorum* additional embryos are sometimes formed from the three cells at the other end of the embryo-sac.

In the white Day Lily (*Lilium ovata*) the embryo develops evidently from some of the cells around the embryo sac and not from the egg cell. The female egg cell disappears entirely.

Polyembryony.—In this manner in the *Citrus* genus (to which the orange belongs) not only is an embryo developed from the egg-cell, but other embryos develop from the tissues of the surrounding nucellus, thus giving a number of embryos in a single seed. This is called "Polyembryony."

PRACTICAL STUDIES.

(24) **Almond Seed.**—Take the commercial almond nut and remove the shell (corresponding to endocarp) enclosing the seed. Examine seed externally as to color, markings. Are the markings on the flat surfaces different from the one on one of the edges. What is the latter? How does the micropylar end differ from the basal end?

Soak the seed in water for several hours and remove the seed-coats. Are there two? If so, how do they differ in color and texture? What is the size of the embryo? How many seed leaves (cotyledons) does it possess? Are they large or small compared with the size of the seed? Are both cotyledons of the same size? Is there anything growing between the cotyledons? What is the size and direction of growth of the root? Is the embryo straight? Is the seed albuminous or ex-albuminous and why? Is it a monocotyledonous or dicotyledonous seed? Apply the starch test (iodine solution) and observe if there is any starch present.

Make a thin section of the embryo and place upon a glass slide, and add a few drops of a saturated solution of chloral. Warm slightly and observe the numerous oil drops. The reserve in the almond seed then consists largely of oil.

(25) **Nux-vomica Seed.**—Note form, color and peculiar surface. Observe if there are any markings. Is there a ridge? Does it extend on the edge or about the middle of one of the flat sides? Does it extend the whole diameter of the seed? What is observed at the terminus of this ridge on the edge of the seed?

Soak a seed in water for about 12 hours and split it open carefully by running the blade of a knife along the edge of the seed? What is the color of the inside? What is there at one end? Of what does it consist? What is the size of the root compared to the remainder of the embryo? How many leaves are there? What is their shape? What is the venation? Is there any stem observed between the seed leaves? What is the remainder of the seed made up of? Is it an albuminous or ex-albuminous seed? Apply a little iodine solution to the reserve and ascertain if it is colored blue? If it is colored yellow it is cellulose. What then constitutes a large amount of reserve in the nux-vomica seed?

Make a thin section through the whole seed, mount in glycerine on a slide, and examine by means of a compound microscope. Examine the hairs and note their size and position. Compare these hairs with those of cotton. Make separate mounts of the section of nux-vomica and of some hairs of cotton, and add a little iodine. Is there any difference in the two?

Fig. 122.—Fruit of nutmeg split open, showing: (p) pericarp; (s) seed or nutmeg, around which is the aril (a) or mace (a).

PHYSIOLOGICAL EFFECTS OF MENTAL WORK.*

Within the present decade the relation between mental work and the bodily processes has been the subject of much study. Interest in the problem as a field for practical inquiry was first aroused by a paper on the fatigue resulting from intellectual work, published by Sikorsky in the *Annales d'Hygiène Publique* for 1897. He was followed more than ten years later by Burgerstein, Laser, Griesbach and others. In these investigations the method used was that of testing school children in classes. Various problems and exercises were set before them, during and after the school session, and the percentage of errors committed in the operations was taken as measure of the fatigue due to mental work. While some individual errors might be due to other causes, the average percentage of the entire class seemed a fair test of this factor. The latest instance of this method are the investigations of Friedrich and Ebbinghaus, described in the May number of the *Naturalist*. At about the same time Mosso and his pupils took up the question from another side. They instituted a series of laboratory investigations upon single individuals by means of the ergograph, with a view to determining the fatigue due to steady intellectual, as well as physical work. Kraepelin and his pupils meanwhile undertook the same problem, varying it with tests of the influence of various stimulants and narcotics on the capacity for mental work. They made use of the reaction time method, as well as the percentage of errors. More recently, Binet and his pupils have taken up the subject from a different standpoint, their object being to measure the effect of mental stimulation and mental effort on the bodily processes of breathing, heart action, etc. Several other investigators have studied this problem in one or other of these forms. Among them may be noted Feré, Patrick and Gilbert, Frey, Bolton, Bergström and Henri.

In an article in the *Année Psychologique* for 1896, M. Henri gives a résumé of the various investigations and the methods used in each. He emphasizes the importance of distinguishing the different factors involved in both mental and physical work, and of studying each one separately by appropriate experimental methods. Among these factors he specifies in particular, attention, voluntary effort, the psychic processes of memory and imagination. Little progress has as yet been made in the way of investigating effort, except in the study of pathological cases, such as *aboulia*. As for attention, while considerable work has been done in this field; the investigations have generally had for their end to determine the mental effects of fatigue and other variations in the conditions, rather than to measure the physical effects of variations in the attention. Memory has been, perhaps, more systematically studied than any of the other factors.

The investigation of the effect of intellectual work on the pulse and other functions which MM. Binet and Courrier have undertaken seems most likely, of all methods so far devised, to furnish a measure of psychical work in physical terms. A series of papers on the subject by these authors has appeared in the *Année Psychologique*, the first in the issue for 1895 and four others in the last volume (Vol. III., 1896). In approaching the question it was first of all necessary to study the effect of changes in respiration on the heart beat and blood supply. A large part of the first paper is accordingly taken up with this and with an examination of possible errors in the apparatus. The instrument used was the plethysmograph of Hallion and Conte. This consists of a rubber cylinder, which is grasped firmly by the hand. The outer surface of the hand is covered with a tight-fitting glove, so that any expansion in volume of the

*The American Naturalist.

hand (due to increased blood pressure) takes effect on the inner surface and results in diminishing the volume of the rubber cylinder. The latter communicates by means of a tube with a flexible drum. When the cylinder is compressed by the hand the drum rises, and the effect is recorded by means of a pen attached to the drum. The apparatus was found to be very serviceable, and was remarkably free from error. In addition to the frequency and strength of the pulse beat, the diastole, or break in the beat, was clearly marked in the diagrams, and proved an important factor in the results.

MM. Binet and Courtier note the existence of important individual differences in the effects of mental work on the physical processes. In some subjects these are confined almost wholly to changes in the respiration, in others to the action of the heart, while in others they are felt more especially in the vaso-motor system. In general, the effect on the respiration is to make it more rapid and at the same time more superficial. The effects on the pulse curve most frequently observed are: 1st, diminution of amplitude; 2d, diminution of amplitude with change of form; 3d, diminution of amplitude, change of form and lowering of the level of the curve. One or other of these effects appears in almost all the subjects tested.

In their later papers the authors consider in turn the various causes of change in the pulse. They confirm the well-known diurnal changes by numerous observations with their own method, *e. g.*, that the pulse becomes more frequent and the diastole generally more marked immediately after a meal. As regards physical exercise, they lay special stress on the changes that occur in the diastole according as the exercise is local, general and moderate, or general and fatiguing.

The study of the effects of mental work is, of course, the most important from the psychological standpoint, and here the authors have sought to combine tests of the heart and respiration with those of the pulse. In addition to the more delicate tests, involving simple mental operations, two of the subjects undertook a piece of severe and prolonged mental work. They spent several hours working steadily at this task, merely resting at the end of each hour for a time sufficient to perform the necessary tests. Comparing the results with those of a similar period passed under similar conditions but without work, the pulse was found to be considerably retarded in the former case, as compared with the latter, the retardation taking place especially in the early part of the period. The authors sum up their results on mental work as follows: "1. An energetic but short mental effort produces an excitation of function, vaso-constriction, acceleration of the heart and of the respiration, followed by a very slight retarding of these functions; in some of the subjects a blunting of the diastole. 2. Intellectual work lasting for several hours, with comparative immobility of the body, produces a retardation of the heart and a diminution of the peripheral capillary circulation."

As regards the relation between physical and mental work, the authors are cautious in drawing conclusions. They observe a certain parallelism, in that a single energetic effort produces an acceleration of the heart and lungs, while a long-continued and fatiguing effort frequently weakens the diastole. On the other hand, the excitation of the heart is more marked and the acceleration of the respiration greater in physical than in mental work; again, in physical work the respiration grows deeper, while in mental work it becomes more superficial; and finally, prolonged mental work tends to produce a weakening of the peripheral circulation—an effect not observed in the experiments on physical work.

The effects of emotion on the heart and pulse are the topic of the last paper by the same authors. The experiments on this difficult problem were contrived with considerable ingenuity. Some of the subjects were children

of from eight to ten, in whom it was easy to excite fear, surprise, pleasure, etc. With adults the tests had to be more carefully planned. A false alarm of fire was prearranged in one case, and resulted in real fear on the part of the subject. Another subject, after being blindfolded, had his hands placed on a pile of worms. A number of tests embodying various emotions were successfully made. It was found that every emotion tended to weaken the pulse. The quality of the emotion, whether pleasurable or painful, had no marked influence—the contrast was altogether between a state of mental rest and one of emotional disturbance. The heart showed a tendency to accelerate when the excitement was strong, and here, too, no difference was observable between the pleasant and the painful. The influence on the respiration was most marked of all. Every emotional excitement produced an acceleration and at the same time an increase in depth and a shortening of the pause.

The authors added a special study of the effects of music on these functions. Their experiments on this point were confined to one person—a man of fine musical appreciation and with considerable of a musical education. They represent, therefore, merely a single type of individual. There was found to be a distinct though slight quickening of the respiration and heart in consequence of hearing the tones themselves, and apart from any emotional "echo" aroused by them. When a melody was played, whether sad or gay, the acceleration was more marked, and it reached a climax when the piece was of a dramatic character and particularly fitted to arouse emotion. This acceleration, however, was not accompanied by any noticeable irregularity. There was at the same time in general a weakening of the capillary circulation, which was less when the sounds had merely a sensorial effect than when they produced a distinct emotional disturbance.

In summing up the whole question of emotional effects on the bodily functions, the authors again lay stress on the differences among individuals. From their own observations they are inclined to distinguish three separate classes of effects: 1. In a majority of persons every emotion produces a vascular constriction, an acceleration of the heart and of the respiration, and an increase of amplitude in the thoracic cavity. 2. In some few cases a sensation of pain or an emotion of sorrow may produce a slight retardation of the heart. And 3. It is possible, as observations made on one subject prove, that the form of the capillary pulse may change with the quality of the emotion; this last effect, they remark, may in time enable us to make a classification of the emotions according to their physiological effects on the form of the pulse.—*Sc. Am. Supplement.*

TEXTILOID, A SUBSTITUTE FOR HARD RUBBER.—The basis of textiloid is an oxidation product which Cadoret calls resinoid. This is made by saponification of 1 part of a suitable oil with 3 to 4 parts of a metallic carbonate and treatment of the soap, so obtained, with 1 part of nitric acid of 36°. After 30 to 35 minutes of contact with the acid the liquid is poured off and the fatty mass saponified with 1 part of caustic alkali. The soap is treated with acid and the liberated resinoid substance purified by solution in ether or alcohol and evaporating the solvent. Of the resinoid so prepared 100 parts are mixed with 20 to 30 parts of zinc oxide, magnesia, kaolin or similar substance, 60 parts of methyl alcohol added and the mixture left undisturbed for 3 or 4 hours. The mass is then passed through 1 or 2 hours through horizontal rollers warmed to 30 or 40° C., and then subjected to a pressure of 200 to 300 atmospheres in a hydraulic press heated to 80 or 90° C. After 5 or 6 hours the proper consistence is reached and the mass can be formed into the desired shape. (*Chem. Ind., through Zeitsch. f. Ph.*)

EMPLOYED IN COMPARING THE TOX- IN PRODUCTION OF DIFFERENT CULTURES.*

By THEOBALD SMITH, M.D.

In a former publication¹ the writer has given the conditions which must be fulfilled in order that a maximum accumulation of toxin may take place in bouillon cultures. The facts there considered and others since then brought out may be very briefly reviewed here. In 1895 Spronck² called attention to the fact that the variable amount of sugar present in beef was responsible for the great fluctuations observed in the toxicity of diphtheria cultures. The writer had observed this independently of Spronck, by studying the relation between the amount of toxin in cultures and the amount of sugar as determined by the fermentation test. Sugar is present in all beef, but in perhaps 10 per cent. the amount is very small. In bouillon made from such beef the writer obtained very strong toxin. In bouillon from beef containing over 0.1 per cent. sugar the toxin was very feeble.

The cause for this difference lies in the acid or acids formed from the dextrose by the diphtheria bacillus, which inhibit the multiplication in a direct ratio to the amount formed. In sufficient quantity the growth may be entirely checked, and finally, when the acidity has reached a certain degree, the bacilli and the toxin are destroyed. Whether there are other causes at work besides mere inhibition of multiplication remains undetermined.

A small amount of dextrose, up to 0.05 per cent., is not inimical to toxin production; in fact, it seems to be more favorable than none at all, probably because a certain minimum amount is necessary for the cell life of the diphtheria bacilli. Bearing these facts in mind, we are better able to comprehend the various changes going on in cultures. The life of the culture begins with a rapid multiplication of the bacilli introduced and the formation of a surface membrane usually within twenty-four hours. At the same time, any sugar present is acted upon at once, with the result that the reaction becomes more acid. If the acidity increases beyond 2 per cent. of a normal acid solution³, the culture is likely to become languid, the surface membrane rifted and settle to the bottom. Some bacilli, by a vigorous surface growth which probably oxidizes the acid products formed, may subdue a larger amount of acid, even to 3.5 per cent., and cause a rapid return towards the alkaline level. The toxin appears in greatest concentration when the alkaline level has been reached, usually within eight to twelve days when sugar is present in small amount only. When sugar is more abundant the acid period is prolonged, during which little growth is evident. After several weeks a slow alkalizing tendency brings the culture to a more vigorous growth and to an alkaline reaction, but without much accumulation of toxin.

Without going into more detail on this subject, we may summarize the conditions under which diphtheria bacilli produce maximum amounts of toxin in the ordinary 1 per cent. (Witte) peptone bouillon as follows:

1. Muscle sugar in the fluid from 0 to 0.05 per cent.
2. Initial reaction from 0.8 to 1.5 per cent. normal acid, the lower figure pertaining to bouillon containing the largest amount of sugar, the higher to bouillon containing none.
3. A thin layer of bouillon freely exposed to the air through one or more cotton-plugged openings in the vessel, and quiescent because the surface membrane which

forms within twenty-four hours must not be disturbed.

4. The accumulation of toxin should be permitted to go on until the growth is checked by the alkaline reaction. This appears in from eight to twelve days, according to the initial reaction and amount of sugar present, and the growth ceases when the reaction is equivalent to 0.2 to 0.3 per cent. normal alkali.

The main difficulty before us, therefore is to get beef containing only traces of dextrose. The writer's original plan, to select the bouillon in accordance with the fermentation test, is not feasible, because so little can be used. Spronck's suggestion, to allow the beef to lie for several days, in order that a partial decomposition by bacteria may transform the sugar, is better, but suffers from certain difficulties. The kind of bacteria cannot be controlled, and frequently the sugar is found but partially removed. Latterly, the writer has given up this method for one more rapid and certain in its action. The beef infusion is prepared either by extracting the chopped beef at 60° C. for several hours, or over night in the refrigerator. After removal of the beef the infusion is inoculated with a culture of some bacterium which rapidly acts upon dextrose, and placed in the thermostat over night. The writer has tried only *B. coli*, and found a complete transformation of carbohydrates taking place over night.

If the case of bouillon designed for diphtheria toxin the incubation should be as short as possible, so as to leave a trace of sugar in the fluid. This can be accomplished by placing the inoculated infusion in the thermostat at 10 p. m. and removing early next morning (8 a. m.) The infusion is then made up in the usual way, with 1 per cent. peptone, $\frac{1}{2}$ per cent. sodium chloride. The final reaction should range, according to the amount of sugar left as stated above, between 0.8 and 1.5 per cent. normal acid, phenolphthalein being used as indicator. It can easily be brought to any desired point by adding from sterile solutions the calculated amount of normal acid or alkali (HCl or NaHO). The whole procedure is very simple after it has been put into routine practice. At any rate, the bacteriologist must make up his mind to give up the early slovenly methods of preparing culture media, or else be prepared for constant reverses and failures.

The bouillon must be sterilized finally in the autoclave, since the ordinary steaming frequently fails to destroy certain spore-bearing anaerobes, which begin to multiply after the diphtheria bacilli have formed a membrane and deoxidized the culture medium. These anaerobes inhibit the production of toxin⁴.

Park and Williams claim⁵ that the amount of dextrose in beef purchased in New York City is not sufficient to interfere with the maximum accumulation of toxin if the culture be made sufficiently alkaline to begin with. This claim I cannot support by my experience with beef bought in the Boston markets. It may be that these authors had under observation bacilli which had acquired, through surface cultivation, a greater power to promptly oxidize acid products. This power is not possessed as a rule, by bacilli recently isolated from the throat, with which this article deals.

A number of observers have published studies of the relative virulence of diphtheria bacilli from various sources, and those persisting in the throat after recovery for a variable length of time. It is not the object of this article to re-examine these writings and review the results obtained. For a summary of the literature the reader is referred to the article by J. H. Wright in the Boston Medical and Surgical Journal, Vol. 131 (1894) page 329, and Scientific Bulletin No. 1, of the health de-

*Twenty-eighth Annual Report of the State Board of Health of Massachusetts.

¹Trans. Association American Physicists, for 1896.

²Annal. de l'Institut Pasteur," 1895.

³A. e., each 100 cubic centimeters of the culture fluid requires 2 cubic centimeters of a normal solution of alkali to bring the whole to the neutral point as determined by phenolphthalein.

⁴Since writing this it has been observed that high temperatures in the autoclave may modify the bouillon in such a manner that only little toxin is formed subsequently. This matter is now under investigation.

⁵Journal of Experimental Medicine," 1. (1896.)

partment, city of New York (1895). A perusal of the various articles will show that the method of testing the virulence of diphtheria bacilli was not adapted to give uniform or quantitative results. Thus, Park and Beebe recommended alkaline glucose bouillon as a culture medium, and the injection of cultures forty-eight hours old. Wright used sugar bouillon very largely. From what we now know of the inhibitory and destructive action of the acids formed from dextrose by diphtheria bacilli, the use of more than 0.1 per cent. dextrose in bouillon must be considered as at least unsafe. However, the authors followed general usage at that time, for even Escherich, in his work on diphtheria issued in 1894, states that dextrose is not decomposed in appreciable manner by diphtheria bacilli, and therefore has no influence on growth.

Authors have not, so far as the writer knows, reported comparative tests of toxin production under conditions as nearly uniform as possible. It was mainly to fill this gap, if possible, that the series of cultures to be described were subjected to a comparative examination from the point of view of toxin production. From a condensed account of the work done (shown in tables accompanying this paper), upon which the calculation of toxin production rests there will be found: (1) the amount of acid produced in dextrose bouillon; (2) the condition of the bouillon used for the cultures, and (3) the test of the filtrate on guinea pigs. The acid production will be dealt with farther on. The facts relative to the bouillon used need some explanation.

The beef used for bouillon, with one exception, was allowed to decompose according to Spronck's suggestion, but the results were not uniform, as stated above. In some of the bouillon the dextrose was absent, in some present in traces, in some in more appreciable amount, according to tests made with the fermentation tube and B. coli. In none was it present in the amount usually found in bouillon made from fresh beef. It is not probable that this slight fluctuation in the amount of dextrose had any appreciable influence on the culture. Where a doubtful result was obtained it was usually supplemented later on with a second test.

The question might be asked, Why not use the same bouillon for all bacilli studied, in place of the many lots actually employed? This would seem the simplest procedure, provided the bouillon did not change with time under the influence of light and air. A diminution in the amount of toxin produced in bouillon which had been standing for some time in a closet not absolutely dark had been casually observed. It is probable that bouillon in vacuo and kept in a dark place might meet the conditions of the problem, but bouillon kept under ordinary conditions would not. Further investigations are now in progress to determine more precisely the degree of change produced in bouillon by age.

It might be claimed that different bacilli isolated from the throat would have different rates of growth in bouillon, and that the accumulation of toxin was simply a factor of the rate of multiplication, rather than of any inherent differences in the physiology of the bacilli. To answer this claim a determination of the number of diphtheria bacilli in cultures is not trustworthy, for the reason that diphtheria bacilli clump together, and the number of colonies in plate cultures may not indicate the number of bacilli used in preparing the plate. Again, bacilli may die in the course of growth, and others take their places. The writer has therefore endeavored to estimate the vigor of growth by the amount of change in the reaction produced. Cultures which in a given time in the same bouillon produced nearly the same amount of alkali may be regarded as having performed the same amount of work and grown with equal vigor. The uniformity of reaction in the various groups of bacilli studied together, after ten or twelve days, was such as to leave little doubt that the growth had been equally

vigorous. When any culture lagged perceptibly behind, it was usually repeated with other bouillon.

The extent of the alkali production varies with the initial reaction of the bouillon and the presence of dextrose. Cultures containing the latter became at first more acid before swinging back to alkalinity. In our report, therefore, it was deemed best to give both the initial reaction of the bouillon, the approximate amount of dextrose and the final reaction. Some idea may thus be gained of the amplitude of change which the fluid underwent during the period of growth permitted.

The culture vessel used at first was a large test tube placed in an inclined position after inoculation. This was soon given up for the Erlenmeyer flask, in which the depth of the bouillon was about 1.5 centimeters.

The toxin formed after ten to twelve days was tested upon guinea pigs. The fluid was passed through filter paper until clear, then diluted with sterile salt solution, so that the quantity of toxin injected was contained in 1 cubic centimeter. Usually 0.1 cubic centimeter of toxin was injected. The place of injection chosen was the left side of the abdomen. Great care was exercised to deposit the fluid in the subcutis, and not to prick the muscles of the abdominal wall. A vascular injection of the omentum or peritoneum is usually a result of the introduction of some of the fluid into the abdomen. When such reddening was noted at the autopsy, the test was repeated upon another animal, since death is hastened somewhat when this occurs. Guinea pigs weighing between 300 and 350 grammes were used whenever possible. When larger ones had to be used, the increase in weight was duly taken into account.

From the results of such inoculations the minimum fatal dose upon a guinea pig weighing 300 grammes was calculated. The calculation when such had to be made was based upon the fact that the minimum fatal dose usually kills a guinea pig in from three and one-half to six days. If x represents this dose, then a guinea pig which succumbed in two and one-half days, or sixty

$\frac{10x}{9}$ hours, received $\frac{10x}{9}$. Guinea pigs of greater weight do

not necessarily bear an exact equivalent increase of toxin, but usually somewhat less. In general, it may be said that the values given as the minimum fatal doses may err within 10 per cent., owing to various factors which cannot be controlled. Among these is a slight variation among guinea pigs in their tolerance of the virus, the darker (black, or black and red) animals being able to stand about 10 per cent. more toxin than the white animals. Even if we allow a variation of 10 per cent. in the values given in our report, the general outcome of the comparative study is not made in any sense untrustworthy.

EXPRESSED OIL OF NUTMEG AND OIL OF MACE.—Nutmeg butter is prepared, according to Warburg, not on the Moluccas, the principal source of nutmegs, but almost exclusively in Europe. The European product comes into the market from Holland in form of cubes, wrapped in paper and weighing about 1½ pounds. In Germany it is said to be obtained by extraction and not by pressure. Nutmeg butter is subject to many adulterations, a customary one being the fat of *Myristica argentea*. It contains much ethereal oil, which may also be obtained from the press cakes in quantities of 8 to 10 percent. According to Koller, this oil is indistinguishable from oil of mace, and in Germany is placed on the market almost entirely as oil of mace. (Ap. Ztg.)

HEGOVIA, a remedy for bed wetting, is stated by the manufacturer to consist of powdered snails, salol and lithium salicylate. (Ph. Post.)

PHARMACY.

GALLACETOPIHENON, a compound closely related to pyrogallol, is used in place of the latter as a 10 per cent. ointment in psoriasis. It is claimed to be less toxic than pyrogallol. (Ph. Post.)

SALUMIN AND SALUMIN SOLUBLE.—The first is the water-insoluble aluminum salicylate, while the second is the easily soluble aluminum ammonium salicylate. Both are white powders and are used for catarrh of nose and throat, also for intertrigo and some forms of eczema. (Ph. Post.)

KITTOOL FIBER used in the manufacture of brushes, is prepared from the fiber of the leaf stalks of the East India jaggery palm. It is "dressed" by being combed between brushes with a little oil to soften it for taking out kinks and curls. After being slightly colored it is placed in bunches for marketing.

AN IMPROVED IRON-CHOCOLATE.—Fuse together in a bright iron mortar 1,000 gm. of cacao mass and 30 gm. of fresh cacao butter. Add 500 gm. of powdered sugar and mix well; then add 60 gm. each of lactate of iron and simple syrup, and sufficient vanilla for flavoring. (Südd. Ap. Ztg.)

FAT PROOF PAPER AND WOOD.—Paper or any fibrous material whatsoever may be rendered impervious to hot or cold fats by immersing in a solution prepared by dissolving 1 p. glue in 8 to 12 p. water and 1 p. alum in 10 p. water and mixing equal parts of the solutions. The process is patented. (Südd. Ap. Ztg.)

ALKALOIDS OF LYCORIS RADIATA.—The bulb of *Lycoris radiata*, natural order Amaryllideae, contains two alkaloids, one of which, lycorine, is the active constituent of the plant. It resembles emetine in physiological action. (Ap. Ztg.)

PREPARATION OF GLANDULEN.—Bronchial glands, preferably of sheep, are extracted with water or alcohol. The active substance, glandulen, is precipitated with acids, washed, dried, and, if to be made into tablets, triturated with milk sugar and compressed. (Ap. Ztg.)

THIOPHENE-DIIODIDE.—An iodoform substitute, used as a 10 per cent. gauze for cuts, purulent wounds, burns, etc., also as a dusting powder, mixed with twice its weight of bismuth subgallate. It acts as an antiseptic and lessens secretions. It is soluble in most vehicles, except water. (Ph. Post.)

EXAMINATION OF DRUGS.—In reply to a question submitted to the Treasury Department, whether there is any regulation of the U. S. customs which requires that drugs entering an American port from a foreign country in original packages shall be held at such port of entry pending examination by a special agent as to their purity, the Assistant Secretary quotes Section 2233, Revised Statutes, as follows: All drugs, medicines, medicinal preparations, including medicinal essential oils and chemical preparations used wholly or in part as medicine, imported from abroad, shall, before passing the custom house, be examined and appraised as well in reference to their quality and fitness for medical purposes as to their value and identity specified in the invoice. The examination is conducted by the examiner of drugs at the port of original entry and not by special agents.

DIFFERENTIATION OF TRUE AND FALSE STAR ANISE.—Tschirch recommends as a distinguishing test the addition of water to an alcoholic tincture of the drug. The tincture prepared from the true star-anise (*Illicium anisatum*) becomes turbid at once, through separation of anethol, while that of the false (*Illicium religiosum*) remains clear. (Ztsch. f. Ph.)

DECOMPOSITION OF CALOMEL TABLETS.—This has been observed by Baroni. The tablets are frequently prepared with a mixture of milk sugar, starch and licorice, the last being added to mask any discoloration occurring in the mixing and compressing. After some time the glycyrrhizin is decomposed, with formation of ammonia, which reacts with the calomel to form ammoniated mercury. (Ph. Post.)

RESIN PENCILS AS DEPLATORIES are employed by Uña. They are prepared from resin, with addition of 10 per cent. of yellow wax. The mass melts at 61 to 62° C. (142 to 144° F.). It is allowed to cool a few degrees before applying, so that there is only a slight and transient burning sensation, without injuring the skin. The pencil is placed lightly upon the skin and allowed to cool, the cooling being assisted by blowing upon it. It is claimed that the removal of 20 hairs by this means is not more painful than that of a single hair with pinners. (Südd. Ap. Ztg.)

PASTE FOR AFFIXING LABELS ON GLASS, PORCELAIN AND METAL.—The Photogr. Ztg. publishes the following: Gum arabic, 15; powdered tragacanth, 7.5 p.; glycerin, 46 p.; thymol, 0.5 p.; alcohol, 3.75 p.; water, to make 120 p. The gum arabic is dissolved in 15 p. of water, the tragacanth triturated with 30 p. of water, until a smooth paste is obtained; the two liquids then mixed and strained. The glycerin is then added and finally the thymol dissolved in the alcohol. (Prog. Ztg.)

JAPANESE CAYENNE PEPPER.—For several years a variety of *Capsicum minimum* has come into the market from Japan, and brings higher prices than the other kinds by reason of its superior appearance, although it is not as pungent as the Sierra Leone and Zanzibar products. It is strong enough, however, for ordinary uses, only for pharmacological purposes it is unsuited. The Natal sort is a variety of *Capsicum annum*. It has larger fruits and is darker than the Japanese. The Sierra Leone kind is yellowish-red; the Zanzibar kind intensely dark-red, often in bad condition, badly dried, containing stems, etc., but yet stronger than the Japanese product. (Ap. Ztg.)

THE PERFECT MOUTH-WASH.—A thoroughly antiseptic mouth-wash is almost impossible for several reasons, which a writer in the American Journal of Dental Science (Ch. and Dr.) puts thus: (1) Owing to dilution with saliva, any drugs sufficiently powerful to destroy germs are rendered almost, if not entirely, inert; (2) the short time of exposure while rinsing the mouth is insufficient for antiseptics of slow action, especially when particles of solid food are impacted in the teeth; (3) Danger of injurious effects on the tooth-structure; (4) Unpleasant tastes are objectionable. Soap, applied with a brush, is one of the best cleaners, because its alkali dissolves the mucons. The following is a good preparation:

Listerine	3 ounces
Glycerine	3 ounces
Carbolic acid	2 drams

Dilute one-half teaspoonful in one-third glass of water. Hold in the mouth and continue the cleansing process carefully by the watch for at least two minutes. This is effective, agreeable to most persons, and valuable by reason of its simplicity, as patients can safely vary the strength in using it from time to time, as the condition may seem to require.

AYAPANA.—This drug consists of the leaves of *Eupatorium triplinerve*, better known as *Eupatorium ayapana*. The habitat of the plant is tropic America. It is used there, particularly in Brazil, as a universal household remedy and is even recommended for snake bite and cholera. In the dry state it has an agreeable odor and a feebly aromatic, slightly bitter and astringent taste. Wherever introduced, its use in form of infusion is adhered to. In Java, Mauritius, Ceylon, India and other countries it is used in that form externally for wounds and abscesses; internally, for stomach disturbances. The action of the drug is stimulant, diaphoretic and stomachic. It is recommended as a substitute for tea, coffee or cocoa. (Ap. Ztg.)

TESTING OF MILK SUGAR.—The following test for glucose and cane sugar is recommended by Beutner (Schweiz. Wochensh.): If 1.2 gm. of pure milk sugar in fine powder be shaken with 12 cc. of dilute alcohol, 10 cc. of the filtrate will leave on evaporation on a water bath about 0.03 gm. (mean result 0.027 gm.). Milk sugar to which 5 per cent. of cane sugar was added, gave by this test 0.076 gm. of residue. Deducting from this 0.027 gm. for milk sugar, leaves 0.049 gm., or 4.9 per cent., for cane sugar. Mixed with 5 per cent. glucose, 4.7 and 4.8 per cent. were found; with 5 per cent. each of glucose and cane sugar, 9.6 and 9.7 per cent.; with 20 per cent. of glucose, 18.7 per cent. It is seen that this test not only discovers adulteration, but also approximately determines its quantity. (Ztsch. f. Phr.)

DRIED MILK is one of the most recent results of food industry. It is a yellowish powder, presenting the appearance of coarse rye flour. According to the manufacturers, it gives a product resembling fresh milk when mixed with water in proper proportions. Chemical analysis shows that the water is reduced from about 88 to about 3 per cent. in this powder. Its composition is as follows:

Total solid matter	95	per cent.
Albumin	25	"
Fat	24 to 25	"
Ash	5.1	"
Milk sugar	40	"

It represents 10 times its weight of fresh milk and may be used advantageously in coffee, cocoa, etc. (Südd. Ap. Ztg.)

PERMEABILITY OF THE HUMAN EPIDERMIS BY SOLID AND FLUID SUBSTANCES.—Fihlens and Mahn (Berl. Klin. Wochensh.) have attempted to ascertain, under which conditions a substance may penetrate through the skin, and for which substances these conditions are fulfilled. They experimented with liquids and solids, leaving out of consideration the absorptive power of the various glands situated in the skin. The human epidermis is a diffusion-membrane, which is saturated with cholesterolin fats and covered on the outer side with ordinary fats, or glycerides. Because of the miscibility of glycerides with cholesterolin fats, a substance need only be soluble in the latter, to pass through the epidermis. The authors conclude that substances taken up by lanolin, the most available cholesterolin fat, will also be absorbed through the epidermis. The following were not taken up by lanolin: Sodium chloride, potassium chloride, potassium iodide, ferrous carbonate, arsenic, tartar emetic, and the mercury of mercurial ointment. When the substances exert a pharmacodynamic action upon the skin, which cannot be denied in the cases of the two last mentioned, it is not due to absorption through it. Absorption is possible with sulphur, corrosive sublimate, lead oxide, lead acetate, iodine, iron chloride and sulphate, as they are either soluble in lanolin or form combinations with lanolin soluble in it. Of organic substances are absorbed: Alcohol, ether, chloroform, the oils of turpentine, saviue, mustard, croton oil, iodoform, carbolic acid, camphor, caryosarin, and the free bases (not their water-soluble salts) nicotine, quinine, veratrine, cocaine and strychnine. (Ap. Ztg.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Unanswered Queries.

This department is maintained exclusively for our subscribers and their clerks. This statement is to call attention to the rules printed at the top of this column and it also explains why the queries of W. J. Felton, Bloomington, Ill.; B. C. Channell, Malone, N. Y., and G. Cochrane, Marion, Ind., remain unanswered. Clerks submitting queries must give us the names of their employers who must be subscribers.

Deodorizing Kerosene Oil.

(L. B.) See this journal, March 4, 1897, 273.

Spanish Brown.

(H. L. S.) Spanish brown is an earthy pigment similar to ochre and used in painting. Its dark reddish-brown color depends upon the sesquioxide of iron it contains.

Salt of Steel

(H. L. S.) "Salt of steel" is an old synonym for sulphate of iron, and as such it was officially noted in the earlier editions of both the London and Edinburgh Pharmacopœias. Other synonyms were salt martis, vitriolum martis seu sal chalybis, vitriol of iron, etc.

Liquor Carbonis Detergens.

(K. R. G.) See this journal, April 15, 1897, page 453. The preparation is not official, though it is in quite general use in hospitals and elsewhere. No doubt a formula should have been given in the National Formulary.

Lacquer for Steel.

(M. D. C.) The following has been recommended: Dissolve pure mastic 10 parts, camphor 5 parts, sandarac 15 parts and elemi 5 parts, in a sufficient quantity of 96 per cent. alcohol, and filter the solution. The lacquer is used cold; it dries clear and transparent.

Fluid Extract Digitalis and Tincture of Strophanthus.

(C. M.) The precipitation of extractive matter in your mixture of fluid extract of digitalis and tincture of strophanthus was due to the different menstrua used in the manufacture of these two preparations. We know of no other reaction which would account for the large quantity of "deposit" you have reported.

Carbolized Oil.

(L. H. H.) Carbolized oil, or more properly carbolic acid liniment is generally prepared by dissolving one part of carbolic acid (crystals) in six parts of olive oil. The peculiar odor of the carbolic acid in the mixture may be somewhat masked by the oil employed but it does not volatilize so readily as you assume.

Witch Hazel Jelly.

(W. S.) See this journal, Nov. 25, 1897, page 799. Here is one other:

Russian isinglass	108 grains
Clarified honey	1 av. ounce
Glycerin	5½ fl. ounces
Distilled extract witch hazel....	4 fl. ounces
Distilled water	5 fl. ounces
Oil neroli	30 drops

Dissolve the isinglass in the water by the aid of a gentle heat, add the witch hazel extract, strain, and finally add the oil.

Tincture Cimicifuga Compound.

(T. H. D.) The American Dispensatory gives the following formula:

Tincture black cohosh	8½ fl. ounces
Tincture blood root	6 fl. ounces
Tincture poke root	1½ fl. ounces

The preparation is said to be a valuable alternative and expectorant and useful in pulmonary affections, hemoptysis, hepatic diseases, dyspepsia, laryngitis, etc. Its most frequent employment is by eclectic practitioners.

Registration in Greater New York.

(X. Y. Z.) Read carefully the information on this subject in the Era of Feb. 10, 1898, page 226. Your certificate as a licentiate of the Tennessee Board of Pharmacy will not exempt you from examination should you desire to become registered in this city. We cannot tell you how the proposed Maryland pharmacy law will provide for the registration of licentiates of Boards of Pharmacy of other States.

Tincture of Nux Vomica.

(J. S. W.) The menstruum used in the preparation of tincture of nux vomica, U. S. P., is a mixture of three volumes of alcohol and one volume of water, and not alcohol, as you state. In this menstruum the extract of nux vomica, previously dried at the required temperature, should all dissolve, which it will do if the extract answers the pharmacopœial requirements. Read what the dispensaries have to say about both extract and tincture.

Syrup of Rhubarb and Soda.

(H. L. S.) Try the following:

Rhubarb, cut into small fragments	3 troy ounces
Sodium carbonate	290 grains
Sugar	24 ounces
Water, a sufficient quantity.	

Dissolve the sodium carbonate in 16 fluid ounces of water and macerate the rhubarb in the solution for twelve hours. Strain, and add enough water through the strainer to make the liquid measure 16 fluid ounces. In this dissolve the sugar. Compare also U. S. P. formulas for syrup rhubarb and mixture of rhubarb and soda. The foregoing formula has been quite extensively used by eclectic physicians.

"Hokey Pokey."

(X., Baltimore.) The preparation sold to newsboys, etc., by street venders and known as "hokey pokey" is nothing more than frozen custard rendered firm by the addition of gelatin. To make it Frye gives this formula: Prepare a suitable quantity of custard and when it is about cold, add to it about one and a half ounces of gelatin dissolved in about one-half pint of water; stir the whole well together, put it into a freezer and proceed with the freezing process, stirring slowly; when frozen the mixture may be molded into bricks and placed in broken ice and salt until hard; remove from the molds in the usual manner and with a knife cut into small squares; dip the knife into hot water while cutting the pieces, then wrap the squares in wax paper and put them in an ice chest until needed.

Cider Preservatives and Cider Therapy.

(W. A. L.) Salicylic acid, bisulphite of lime, formalin and various other antiseptics have been recommended for the preservation of cider. Of the first named about 1½ ounces to 50 gallons of cider are required. A so-called "calcium sulphite" is on the market in packages just the size for one barrel of cider (32 gallons).

Cider has been used as a remedy for many ailments, such as rheumatism, biliousness, jaundice, indigestion, etc. Dr. John King, in the American Dispensatory, states that "cider forms not only a refreshing and agreeable drink for patients with fever, but it exerts a salutary medicinal influence," etc. The same writer

says he has found cider in which horse-radish has been steeped, an efficacious remedy in dropsy. Other advocates of cider as a "medicine" might be quoted. There is no special formula for the preparation of cider as a drink for invalids. Care should be taken, however to use cider made from sound ripe apples. If desired it may be sweetened and flavored, though this procedure is hardly necessary.

Shampoo Paste.

(J. G. D.) See this journal, Dec. 9, 1897, page S97. Here are two other formulas:

(1) White castile soap, in shavings ..	2 av. ounces
Ammonia water	1 fl. ounce
Bay rum, or cologne water	1 fl. ounce
Glycerin	1 fl. ounce
Water	12 fl. ounces

Dissolve the soap in the water by means of heat; when nearly cold, stir in the other ingredients.

(2) Borax	2 av. ounces
Glycerin	1 fl. ounce
Rum	10 fl. ounces
Bay rum	10 fl. ounces
Whites of egg	2

Incorporate the borax in fine powder with the glycerin and add the bay rum and rum gradually and with constant stirring to the mixture. The previously well beaten white of egg is added lastly, and the whole stirred thoroughly until an even mixture results.

Menthol Pencils.

(X. Baltimore.) The Era Formulary gives this one: (1) Cocoa butter is melted on a water bath with 3 to 4 per cent. of pure wax, and the menthol is added to the somewhat cooled mass in the proportion prescribed by the physician—this amounting usually to 3 or 4 per cent. By suction it is collected in glass tubes of the required bore—from the thickness of a knitting needle to that of a lead pencil—which have previously been moistened with glycerine, and the tubes are then placed in cold water. After a short time the menthol pencils are removed from the tubes by means of wires or glass rods of suitable size.

(2) Menthol	1 part
Chloral-hydrate	1 part
Cacao butter	2 parts
Spermæti	4 parts

Fuse the latter two together, add the first two, then the mixture can be moulded.

Clearing Solution for Dry Plates.

(M. D. C.)

(1) Alum	1 ounce
Citric acid	1 ounce
Sulphate of iron	3 ounces
Water	20 ounces

Soak for a minute or two, when clearing should be complete.

Clearing Solution for Pyro-Negatives.

(2) Alum	2 ounces
Hydrochloric acid	2 fl. ounces
Boric acid	1 ounce
Water	32 fl. ounces

The solution can be used over and over again. It will do its work in one-half minute. The negative should be well washed.

Chautauque Clearing Solution.

(3) Alum	2 ounces
Water	30 fl. ounces
Citric acid	½ ounce

(4) Sometimes by prolonged development negatives become stained, and usually clearing solutions are employed after the negative is fixed. Mr. T. Bedding, in the British Journal of Photography, advises the use of an alum and citric acid bath, one part of citric acid to thirty of alum, before fixing. When the developer has been poured off the negative, the latter has been washed in a couple of changes of water, and the clearing solution applied for a few minutes, after which it

may be returned to the bottle for future use. It is then important that the negative be carefully washed prior to immersion in the fixing bath.

Laundry Polish.

(F. P. K.) See this journal, July 1, 1897, page 13. Here are some other formulas from the Era Formulary:

(1) Melt 5 parts of stearic acid, add 5 parts of absolute alcohol, and triturate the mixture with 95 parts of wheat starch. Starch prepared with this mixture takes easily a fine polish. The polishing irons should be thoroughly cleaned immediately after use.

(2) Spermaceti	1½ ounces
Gum arabic	1½ ounces
Borax	1½ ounces
Glycerin	4½ ounces
Distilled water	1½ pints

If desired to use with starch mix 4½ teaspoonfuls with 4½ ounces of boiling starch.

(3) White wax	2 ounces
Spermaceti	4 ounces
Stearin	½ ounce
Ultramarine blue	3 grains

Melt together, and let cool.

For doing up a dozen shirts, put a piece the size of a hazelnut in the hot starch, and mix. Finish with a hot iron, the usual way.

Grain Alcohol.

(E. S.) Grain alcohol is the name originally applied to alcohol produced from grain, although it is now quite generally used to distinguish ordinary or ethylic alcohol, from whatever source derived, from methylic or wood alcohol. Among distillers, the terms "grain spirit," "potato spirit," "corn spirit," etc., take their names from the kind of material used in the production of the raw spirit. From the last annual report of the U. S. Commissioner of Internal Revenue we learn that the quantity of grain used for the production of spirits during the fiscal year ending June 30, 1897, was 13,131,891 bushels. This number of bushels was a decrease of 5,498,727 bushels from the quantity used in the preceding fiscal year, and is 8,240,173 bushels less than the average for the last ten years. The yield of spirits from each bushel of grain was 4.504 gallons. The quantity of spirits produced from molasses during the fiscal year ending June 30, 1897, was 3,310,771 gallons, and was an increase of 668,449 gallons over the product of the previous year. The quantity of molasses used for the production of spirits during the same period was 4,441,482 gallons. The average yield per gallon of molasses used for the production of spirits was .7454 gallons.

Rheumatic Cure.

(E. E. C.) We cannot give the formula for the proprietary article. The following have, however, been recommended for a similar purpose:

(1) Lithium benzoate	4 scruples
Potassium iodide	½ dram
Tincture serpentaria	2 drams
Wine colchicum	1 dram
Fluid extract manaca	1½ drams
Chloroform water, enough to make	8 ounces
Adult dose: Two tablespoonfuls twice a day.	
(2) Sodium salicylate	2 drams
Potassium iodide	2 drams
Potassium acetate	2 drams
Fluid extract cascara sagrada ..	4 fl. drams
Glycerin	4 fl. drams
Cinnamon water	4 fl. drams
Peppermint water, enough to make	3 fl. ounces
Teaspoonful every four hours.	
(3) Potassium bicarbonate	5 ounces
Potassium iodide	2½ ounces
Sodium salicylate	2½ ounces
Wine of colchicum	3½ ounces
Infusion of buchu, q. s. to make..	
(4) Potassium iodide	1 gallon
Fluid extract hemlock	3 drams
Fluid extract senna	3 drams
Tincture colchicum root	3 drams
Ammoniated tincture guaiac	4 drams
Syrup sarsaparilla compound, q. s.	
to make	
	16 ounces

Solution Hypophosphites Without Sugar.

(O. B.) Formula No. 225 of the National Formulary produces a preparation of the character you name. Here are two others:

(1) Calcium hypophosphite	384 grains
Sodium hypophosphite	128 grains
Potassium hypophosphite	64 grains
Iron phosphate, soluble	64 grains
Hypophosphorous acid, diluted...	3 fl. ounces
Water, enough to make	16 fl. ounces

Triturate the hypophosphites to fine powder and dissolve in 12 fluid ounces of water; dissolve the iron salt in 1 fluid ounce of hot water and add to previous solution; then add the acid, and after standing twenty-four hours, filter, adding enough water through the filter to make 16 fluid ounces of product.

The following formula contains strychnine sulphate:

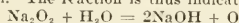
(2) Calcium hypophosphite	1½ av. ozs.
Sodium hypophosphite	¾ av. oz.
Potassium hypophosphite	¼ av. oz.
Strychnine sulphate	2 grains
Citric acid	5 grains
Oil of bitter almond	10 minims
Alcohol	6 fl. ounces
Water	25 fl. ounces

Rub the hypophosphites and citric acid to a fine powder in a mortar, and then with water until dissolved. Dissolve the strychnine sulphate by triturating with the alcohol, add the oil of bitter almond, and mix the solution with the solution of hypophosphites. Filter.

A syrup of hypophosphites is a much more palatable preparation, however, and you can do no better than to use the formula of the Pharmacopœia.

Sodium Peroxide.

(H. L. B.) Sodium peroxide, Na₂O₂, is obtained by allowing sodium to burn briskly in oxygen. It is a yellowish-white solid, which decomposes in contact with water, with considerable rise of temperature and evolution of oxygen. The reaction is thus indicated:



According to Newth, the oxygen which is evolved in the above reaction contains appreciable quantities of ozone. When sodium peroxide is slowly added to water, or to dilute acids in the cold, hydrogen peroxide is formed, thus:



Sodium peroxide has gained much popularity within the last few years as a bleaching and oxidizing agent. Its general properties have thus been summed up by a writer in the Chemical Trades Journal (Era, Dec. 15, 1892, page 360): It dissolves in water, producing a considerable rise in temperature and evolving a certain amount of oxygen, which provokes coughing. It must be kept away from moisture, as it is very hygroscopic; exposed to air it gains 20 per cent. in weight in twenty-four hours, even when the surface is not disturbed. Its handling may present some danger when it is in contact with some water and organic matter simultaneously. It can, for example, be heated with aniline (azobenzene being formed) or with benzene, but if water be added to the mixture, flames are produced, accompanied in the case of benzene, by an explosion. The commercial article contains about 20 per cent. of active oxygen, corresponding to the formula Na₂O₂ (20.51 per cent.). It dissolves without evolution of oxygen, in dilute acids, when the temperature is not allowed to rise, and a solution of hydrogen peroxide is thus produced.

Embossing Glass With "White Acid."

(E. D. S.) A writer in a recent issue of the Car Journal gives the following practical information:

To prepare a bath for what is called white acid cut, have made a pan or square dish of sheet lead or zinc, about 6 inches deep and large enough to hold the glass you wish to cut. Then put into this 6 or 8 parts of water to 1 of fluorine acid. If not strong enough add more acid, or, if it should cut too roughly, add water. To the above

add carbonate of ammonia, stir well, and drop in pieces of glass waxed on the one side, and after several minutes take them out and see if the acid is working properly. By working and adding different proportions you will soon get the bath so that it will work properly.

To prepare the glass for the bath, hold the plate over a heater until it will melt beeswax. Coat over with wax, take a thin sheet of lead foil, roll it on the side and burnish down smooth. On this pounce your pattern that you wish to cut out and follow the lines of the pattern with a sharp needle or embossing tool. Pull out the pattern and rub down the edges so that the acid will not get under and make a rough edge. Clean the lines out with turpentine or gasoline and place in bath, after waxing the opposite side of the glass.

The writer further states that the "matt" appearance is not always the same on all kinds of glass. If the surface does not appear proper and even, use the following preparation instead: One part fluoride of ammonium to 3 parts sulphate of barium, with a little sulphuric acid. Mix this to the consistency of milk and apply to the face of the glass. The acid preparations must be kept in rubber or leaden bottles when not in use.

The above is the regular way of cutting glass, but there is a method when, by using a mould and paste, a person can make a dozen in the time he would be cutting out one in lead foil.

Preparing Coffee.

(J. J. R.) There are so many different varieties of coffee and such a wide dissimilarity of tastes, that it is next to impossible to suggest the special kind of coffee to select for use, even for the average consumer, the same difficulty also applying to what constitutes the requisite quantity. Many old-time coffee-drinkers prefer a strong, dark, or, as they term it, "an old-fashioned Rio." Others like a good Maracaibo, or other fine, mild grade, such as Ceylon, Jamaica and Guatemala; in fact, these are the most popular grades and the choice of the majority of consumers, not only on account of their intrinsic merits, but also on account of price. For an exceedingly fine coffee, however, the best results are obtained from a combination of true Java and genuine Mocha, mixed in the proportion of two-thirds of the former to one-third of the latter, fresh roasted, fresh ground and fresh made; while, with regard to quantity, one, two and three tablespoonfuls to each pint of water is recommended, according to the number to be served and the strength required.

The degree of strength is altogether a matter of taste, two ounces, or four heaping tablespoonfuls, of pure, ground coffee, made with absolutely boiling water, will yield a full quart of average strength, making a pleasant and well-flavored breakfast coffee. But for four persons a tea-cup of finely-ground coffee—the finer, the better—will be required, to be served as soon as made, as the infusion rapidly deteriorates by standing too long.

From Walsh's "Coffee, Its History, Classification," etc., we take the following formulas:

Café de Paris,—or "French Coffee" is generally prepared by mixing a cupful of finely-ground coffee with a raw egg and shell in a quart of cold water and placing the pot over a brisk fire, occasionally stirring it until the boiling point is reached, after which set the vessel aside to simmer for a few minutes, then pour on a cupful of cold water and allow to stand for eight or ten minutes before serving, using cream and sugar to suit.

Café au Lait—or "French Breakfast Coffee" is made by grinding two tablespoonfuls of coffee for each cup required, and packing solidly in a regular French filtering coffee-pot, pouring on boiling water and passing it from two to three times through the coffee-pot. When serving, boiling milk in equal quantity or to suit the individual taste, is poured into the cup from a separate vessel, after which it is sweetened to suit. The French

usually mix chicory with their coffee, particularly when used in the form of café au lait. For this form, add half tablespoonful of powdered chicory to two tablespoonfuls of ground coffee, and after thoroughly mixing, pour on boiling water and pass twice through the coffee-pot before serving.

Café Noir.—A black "after-dinner coffee," is prepared by adding four ounces of freshly-ground strong coffee to a quart of absolutely boiling water and allowing it to stand until it reaches the boiling point, meantime passing it twice or three through the coffee-pot before serving.

Café au Crème.—Is prepared by the addition of boiled cream to clear, strong, fresh-made coffee and allowing to infuse or draw together from fifteen to twenty minutes.

A combination of one part Mocha, one part Rio and two parts Java or Maracaibo will yield a heavy, rich, strong-flavored coffee, but not as smooth and pleasing as if the Rio were omitted, unless for those preferring it. In other words, when a smooth and delicate-flavored beverage is required, use one-third Mocha and two-thirds Java. When strong and heavy is desired, use Rio and Maracaibo, or temper the former by combining it with some of the milder kinds. When a rich, smooth beverage is desired, a combination of one-third Mocha and two-thirds Java; if a medium, Java and Maracaibo or some other good, mild grade. But when a heavy body and strong flavor is required, a blend of Rio or Santos and Maracaibo in equal proportions should be made, good Maracaibo being equal to many Javas and is constantly substituted for it by unprincipled dealers, both wholesale and retail.

A combination consisting of one-third Mocha and two-thirds Java fresh roasted and fresh ground makes an ideal cup of coffee. Two tablespoonfuls or one ounce of this blend to each pint of boiling water produces a beverage that cannot fail to suit the average taste. But for consumers who prefer a heavy-bodied beverage, a combination of equal quantities of Santos, Caracas and Maracaibo, will be found to yield a rich, heavy, pungent and fragrant liquor. These quantities are intended for a strong beverage, but where only a moderate degree of strength is desired, it is best to use only half these quantities of coffee to the same quantity of water.

Blackboard Siding.

- (B) Here are several formulas:
- | | |
|---|------------------------|
| (1) Lampblack | 1 ounce |
| Powdered pumice stone | 4 ounces |
| Boiled linseed oil | 8 ounces |
| Spirits turpentine, q. s. | 2 pints |
| (2) Sodium silicate, diluted with water and colored with lampblack, suspended in a little of the silicate, makes an excellent siding. | |
| (3) To make 1 gallon of the paint for a blackboard, take 10 ounces pulverized and sifted pumice, 6 ounces powdered rottenstone (infusorial silica), $\frac{3}{4}$ pound good lampblack, and alcohol enough to form with these a thick paste, which must be well rubbed and ground together. Then dissolve 14 ounces shellac in the remainder of the gallon of alcohol by digestion and agitation, and finally mix the varnish and the paste together. The resulting mixture is applied to the board with a brush, care being taken to keep it well stirred, so that the pumice will not settle. Two coats are usually necessary; the first should be allowed to dry thoroughly before the second is put on, the latter being applied as so not to disturb or rub off any portion of the first. One gallon of this paint will ordinarily furnish two coats for 60 square yards of blackboard. When the paint is to be put on plastered walls, the wall should be previously coated with glue size—1 pound glue, 1 gallon water, enough lampblack to color, put on hot. | |
| (4) Shellac | 8 ounces |
| Lampblack | 1 $\frac{1}{2}$ ounces |
| Ultramarine blue | 3 $\frac{1}{4}$ ounces |
| Powdered rottenstone | 4 ounces |
| Powd. pumice stone | 6 ounces |
| Alcohol, 95 per cent. | 4 pints |

Dissolve the shellac in the alcohol, then add the other ingredients finely powdered, and shake well.

To apply the siding, have the surface of the board smooth and perfectly free from grease. Shake well the bottle containing the preparation, pour a small quantity into a dish, and apply with a new flat varnish brush as rapidly as possible. Shake before using and keep the bottle well corked.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

las H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
rgil Coblentz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Phar.D.
lber G. Compher, A. M., M. D.	Charles W. Parsons, Ph.C.
bert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
mes M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
thur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
arles F. Heebner, Phm.B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
orge B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M.D.
J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
erry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
ward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Jullus W. Sturmer, Ph.G.
	Frederick J. Walling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in **THE PHARMACEUTICAL ERA**, and the **QUIZZES** and **EXAMINATIONS** are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and **DIPLOMAS** are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 49.

Inorganic Chemistry.

The Boron Family.

BORON. ALUMINIUM. GALLIUM. INDIUM. THALLIUM.

The first member only of this family is a non-metal, the remaining four being possessed of decided metallic qualities, both in the free state and in combination. The last three are rare elements, and of but little practical importance. None of the family are found in the free state in nature.

BORON.

Symbol B. Valence 3. Atomic Weight 10.9. Specific Gravity 2.68.

Historical.—Borax, the sodium compound of boric acid, is known to the alchemists before the time of Geber, and under the name of tincal has long been imported from India. The element was first isolated by Gay Lussac and Thenard in 1807, and independently by Sir Humphrey Davy in 1808. It was first carefully studied and described by Berzelius in 1824. The name is derived from Borax, its principal compound.

Natural Occurrence.—Boron never occurs free in nature. The principal natural compound is borax, or sodium borate, found in various parts of the earth, especially large deposits occurring in the arid districts of the western part of the United States. Other natural compounds are borates of calcium and magnesium, and boric acid, the latter being found in the hot springs or lagoons of Iceland, whence it is obtained in large quantities.

Preparation.—The element can be obtained in the free state by fusing together boron trioxid, B_2O_3 , and metallic sodium, the surface of the mixture being kept covered with sodium chloride to prevent the liberated element from again combining with oxygen.

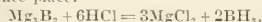
Description and Physical Properties.—As obtained by the preceding process boron is in the form of a brown, amorphous powder, slightly soluble in water. If the amorphous form be heated to a white heat in contact with aluminium it is dissolved by the latter, and separates out on the cooling of the metal in lustrous yellow or reddish brown crystals, nearly as hard as the diamond. Another

form is known, somewhat resembling graphite. The specific gravity of the crystalline variety is 2.68.

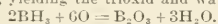
Chemical Properties.—Heated in the air, amorphous boron burns, forming the trioxid, B_2O_3 . It is oxidized by nitric and sulfuric acids to boric acid, H_3BO_3 , and unites with fused sodium hydrate to form borax. It is also capable of uniting directly with nitrogen to form a nitrid, BN.

COMPOUNDS OF BORON.

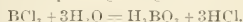
Hydrogen Compound.—Boron forms one compound with hydrogen, boron hydrid, BH_3 , prepared by treating magnesium borid with hydrochloric acid, when the following reaction takes place:



Boron hydrid is an instable, colorless gas, of a disagreeable, nauseating odor. When ignited it burns with a green flame, yielding the trioxid and water.



Halogen Compounds.—Boron forms several trihalids, BCl_3 , BBr_3 , and BF_3 . They are instable and when brought in contact with water are decomposed, forming boric acid and the corresponding halogen acid.

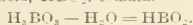


Oxygen Compound.—Boron forms one oxid, the trioxid, B_2O_3 . It is formed when amorphous boron is burned in the air, but is prepared commercially by heating boric acid, H_3BO_3 , to redness, when water is driven off and the trioxid remains,



It is a glass-like mass, soluble in water, and when fused has the property of dissolving many metallic oxids.

Oxygen Acids of Boron and their Salts.—Boron trioxid is the anhydrid of ordinary or orthoboric acid, H_3BO_3 . When this is heated to $100^\circ C$, one molecule of water is evolved and metaboric acid, HBO_2 , remains—



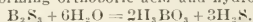
When the latter is heated to $160^\circ C$, a further elimi-

nation of water occurs, and tetraboric acid is left behind—



The most important salt of this acid is borax or sodium tetraborate, $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$. It is largely used for detergent purposes, in the laboratory, and as a flux in the reduction and smelting of metals. When heated it first swells up, gives off water, and melts to a colorless glass, which has the property of dissolving numerous metallic oxides, some of which impart to it characteristic colors.

Sulfur Compound.—When sulfur and amorphous boron are heated together they combine to form a sulfid, B_2S_3 . When brought into contact with water it decomposes violently, forming orthoboric acid and hydrogen sulfid.



Characteristic Reactions.—The two common compounds of boron and orthoboric acid and borax, distinguished by their fusing to form transparent glasses which may be colored by certain metallic oxides, and by the green color which the free acid imparts to the non-luminous flame. Borax is also decomposed by glycerin.

ALUMINUM.

Symbol A. Valence 3. Atomic Weight 27.04. Specific Gravity 2.56 to 2.74.

Historical.—The metal was first obtained in the free state by Wöhler, in 1827, by heating together aluminum chlorid and metallic potassium. This process was improved in 1855 by St. Clair Deville, who used the double chlorid of aluminum and sodium, and substituted the cheaper metal sodium for potassium. Since 1885 the metal has chiefly been produced by the electrolytic processes developed by Cowles, Hall, Heroult, and others. The name is derived from alum, one of its principal compounds.

Natural Occurrence.—Aluminum occurs naturally in a large number of minerals. Kaolin, or china clay, the feldspars, mica, and garnet are examples of silicates containing the metal. Boraxite and diaspore are aluminum hydroxids, and wavelite and turquoise are aluminum phosphates. The oxid when coarse and impure is known as corundum or emery, and when crystallized as the ruby and sapphire. Another important natural compound is the double fluorid of aluminum and sodium, known as cryolite. The common clays used in the manufacture of bricks and stoneware differ from the white china clay mainly in containing a larger percentage of silica and iron, to the latter of which they owe their yellow or red colors.

Preparation.—The metal is at present prepared almost wholly by the electrolytic process, or by passing a powerful electric current through an electrolyte consisting of aluminum oxid dissolved in a bath of melted cryolite.

Description and Physical Properties.—Aluminum is a lustrous, bluish-white metal, softer than silver, and is both malleable and ductile. The specific gravity varies from 2.56 in the cast metal to 2.74 when drawn into wire. Its melting point is 700°C , or under. In the form of bars and sheets it is highly sonorous. It is a good conductor of heat, and nearly eight times as good a conductor of electricity as iron.

Chemical Properties.—Pure aluminum does not tarnish either in dry or in moist air. It is but little affected by the reagents which corrode or tarnish the common metals, nor is it discolored by hydrogen sulfid. It is soluble in strong solutions of the alkaline hydrates, and is readily dissolved by hydrochloric acid either strong or dilute. It is slowly dissolved by boiling nitric acid, and is scarcely attacked by sulfuric.

Uses and Alloys.—Owing to its strength, lightness, and freedom from oxidation or corrodibility, there is scarcely any limit to the applications of aluminum for mechanical and commercial purposes. Its valuable qualities have enabled it to replace copper and its alloys and other metals in many articles of manufacture. Its future use

seems destined to be limited only by the cost of production, and this is constantly decreasing.

Aluminum bronze, consisting of copper with five to ten per cent. of aluminum, has a color resembling gold, is less easily tarnished and is more easily worked than ordinary bronze. Added to iron in small amount it increases the fluidity of the latter when melted, enabling the making of finer and smoother, and more homogeneous, castings.

COMPOUNDS OF ALUMINUM.

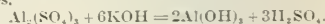
Halogen Compounds.—Aluminum forms one series of compounds with the halogens, each consisting of one atom of the metal to three of the non-metal. Of these the chlorid, AlCl_3 , prepared by heating aluminum in a current of dry chlorine, is the most important. Prepared in this way it is a white, crystalline solid, absorbing moisture with such affinity as to fume in the air, yielding vapors of hydrochloric acid and being converted into aluminum hydroxid. The same decomposition into hydroxid and acid occurs when a solution of aluminum chlorid is evaporated.



The bromid, AlBr_3 , and iodid AlI_3 , are obtained in a manner similar to the chlorid, and have similar properties.

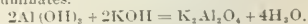
The fluorid and the natural double fluorid of aluminum and sodium are employed in the manufacture of the metal.

Oxygen Compounds.—Aluminum forms one oxid, Al_2O_3 , and one hydroxid, $\text{Al}(\text{OH})_3$. The hydroxid is precipitated as a white, gelatinous precipitate by the hydroxids of the alkalis.



When the hydroxid is heated, water is evolved and the oxid remains behind.

The oxid and hydroxid have both basic and acid properties. They dissolve in acids to form salts of aluminum or in the stronger bases, as potassium and sodium, to form aluminates.



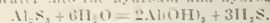
The oxid after heating to redness is soluble in neither acids nor alkalis.

The hydroxid is official under the title of *Alumini Hydroxide*.

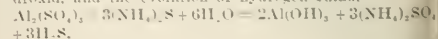
Other Important Compounds.—The sulfate, $\text{Al}_2(\text{SO}_4)_3$, crystallizing with sixteen molecules of water, may be prepared by dissolving the hydroxid in sulfuric acid and crystallizing. Aluminum sulphate is capable of crystallizing molecule for molecule, with the sulfates of the alkali metals, the resulting double sulfate being known as *alum*. The alum of the Pharmacopoeia is the potassium aluminum sulfate, $\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$. Its water of crystallization, which may be driven off by heat, amounts to 45.52 per cent. of its weight. On account of its difference in price, ammonia alum, $(\text{NH}_4)_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$, is frequently substituted for the official compound.

Owing to their being isomorphous with the aluminum compounds, i. e., having the same crystalline form, the other double sulfates of a trivalent and a univalent metal are also known as alums. Iron alum, $(\text{NH}_4)_2\text{SO}_4 \cdot \text{Fe}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$, and chrome alum, $\text{K}_2\text{SO}_4 \cdot \text{Cr}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$, are examples.

Aluminum Sulfid. Al_2S_3 can be prepared by fusing together powdered aluminum and sulfur. It is decomposed by water into the hydroxid and hydrogen sulfid.

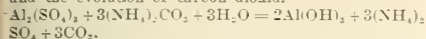


This instability of the sulfid in the presence of water explains why the addition of an alkaline sulfid to an aluminum salt causes the precipitation of aluminum hydroxid, and the evolution of hydrogen sulfid.



In like manner the addition of a carbonate to an alum.

num compound causes the precipitation of the hydroxid, and the evolution of carbon dioxide.



Ultramarine is a blue pigment, formerly obtained from the mineral lapis lazuli, but now prepared very cheaply and in large quantity by heating together a mixture of clay, charcoal, and sulfate or carbonate of sodium. The green compound thus obtained is ground with sublimed sulfur, and again heated until the desired blue shade is obtained. The exact nature of the mixture is unknown, but it probably contains a double silicate of sodium and aluminum, with sodium sulfid. When treated with hydrochloric acid the color is discharged, and hydrogen sulfid evolved.

Characteristic Reactions—Aluminum compounds are characterized by yielding the grayish white, gelatinous hydroxid, with alkalis, soluble in excess of potassium or sodium hydroxid, only slightly soluble in ammonia, and not at all if ammonium chloride be present. Also by yielding a precipitate of hydroxid when treated with ammonium sulfid, or carbonate, with evolution of hydrogen sulfid or carbon dioxide. With sodium thiosulfate the hydroxid is precipitated with free sulfur and the evolution of sulfur dioxide.

PRACTICAL STUDIES.

1. Bend a small loop or ring at the end of a platinum wire, heat to redness and dip into powdered borax. Heat the borax, using a blow-pipe, adding more borax if necessary, until a colorless bead results. Dip the bead into a solution of any compound of manganese, copper, chromium, or cobalt, and again heat with the blow-pipe. Note

the color of the bead while hot, and after cooling. If the color is not decided, repeat the dipping and heating one or more times.

2. Break off the bead by pinching with a pair of pliers. Make a fresh bead, dip in sulfuric acid, and hold in the non-luminous flame. What change takes place in the color of the flame?

3. Repeat the last experiment, but dipping the bead in glycerin instead of sulfuric acid, and note the result.

4. Place a gram or more of powdered borax in a small evaporating dish, add enough sulfuric acid to moisten thoroughly, and stir until completely mixed. Add 10 to 15 cc. of alcohol, stir up thoroughly, and ignite. What is the appearance of the flame produced? Extinguish and ignite several times, and determine when the color of the flame is most brilliant.

5. To a solution of alum add solution of potassium or sodium hydrate in just sufficient quantity to produce a heavy precipitate.

6. After noting the character of the preceding precipitate add more of the alkali, and shake the mixture. Is the aluminum hydroxid soluble in excess?

7. To determine whether the alum used is ammonia alum, heat the solution last obtained and note whether the odor of ammonia appears.

8. To some solution of alum add ammonium hydroxid, and determine whether the aluminum hydroxid produced is soluble in excess.

9. To solution of alum add ammonium sulfid. What is the precipitate produced? Is a gas evolved? If so, what is it?

10. Repeat the last experiment, but using ammonium carbonate instead of the sulfid. Note the results as before.

LECTURE No. 50.

Pharmaceutical Microscopy.

INTRODUCTORY.

TEXT BOOKS ON MICROSCOPY.

The ensuing lectures on microscopy are of necessity brief and confined to a consideration of elementary principles. For those who have the inclination to pursue the subject further, the following texts are recommended: *Gage, Microscopical Methods*, Crockwell Publishing Co., Ithaca, N. Y., Price, \$1.50. *Clark, Practical Methods in Microscopy*, D. C. Heath & Co., Boston, Mass., Price, \$1.60. *Base, Elements of Vegetable Microscopy*, published by the author, Baltimore, Md., price, \$1.00.

INTRODUCTORY.

As an instrument of pharmaceutical practice the microscope is constantly and rapidly growing in importance.

Since the pharmacist no longer reduces crude drugs to be powdered form, but purchases the powders prepared by the large manufacturer, it is of the highest importance that he should possess the means for determining the quality and genuineness of the article supplied by the drug miller. Another important function of the pharmaceutical chemist is the examination of the bodily excretions and excretions as an aid to the diagnosis of the physician, and to act as the general and sanitary analyst of the community in which he lives. Here is a profitable and promising field of usefulness for the future pharmacist, and one to which he has naturally the best right, but which, like other important portions of pharmaceutical work, will most certainly pass into other hands unless by timely preparation he shall fit himself or the performance of these duties as they arise. For these purposes the use of the microscope is indispensable.

For these and for many other reasons which might be presented the education of the modern pharmacist cannot be said to be complete unless it includes at least an elementary training in the theory and use of the microscope.

As the compound microscope is purely an optical instrument, it will be profitable to make a brief review of the principles and laws of the science of optics before proceeding to a consideration of the instrument itself, or the methods of its manipulation.

The Undulatory Theory of Light.—The modern, or, as it is commonly known, the undulatory theory of light is based upon the assumption that all space is filled with an exceedingly tenuous and highly elastic medium known as "the ether," which freely penetrates all portions of matter and fills the openings between their molecules, or as it has been described, the molecules of matter are imbedded in the ether like raisins in a jelly. Being in such intimate contact with each other, the ether is capable of communicating its own vibrations to the molecules or of being set in vibration by them. It is due to this ability of the ether waves to set up vibrations in the molecules of matter that bodies may be heated by the sun's rays, or that the molecules of matter when sufficiently heated by chemical, electrical or other means may communicate their vibrations to the ether and thus produce the phenomenon known as light.

In like manner it is through the ether vibrations of the sun's rays that the chlorophyll bodies of the green plant are able to decompose the molecules of carbon dioxide of the atmosphere and build the elements into tissues, that the sensitive compounds on the photographer's plate are decomposed, and that many other chemical reactions are caused to take place.

Decomposition of White Light.—If a narrow beam of white light, i. e., sunlight, be caused to pass through a triangular glass prism it is spread out into a colored band known as the *solar spectrum*. If the spectrum produced by one prism be caused to pass through a second prism placed in a reversed position the colors are recombined and the beam of white light reproduced. Hence it is concluded that white light is a mixture of all the colors of the spectrum.

By suitable means it can be shown that the colors of the solar spectrum are produced by ether waves of different lengths, those in the red by the longest and those in the violet by the shortest. The intermediate colors are due to waves of intermediate lengths.

Relation of Ether Waves to Vision.—The retina of the eye is essentially of the nature of a photographic plate, consisting of a delicate membrane whose histological elements are saturated with a chemical substance sensitive to ether vibrations. By means of the crystalline lens and other refracting media of the eye an image is projected upon this sensitive membrane or "photographic plate," the ether waves which form the image causing chemical changes in the coloring matter of the retina, and in fact print an image upon it of the object looked at. These changes in the retina in some way set up nervous impulses in the nerve elements of which it is composed, and these impulses travel along the optic nerve to the optic center of the brain and there produce the sensation of sight.

Waves of different lengths cause different kinds of impulses, and thus the different color sensations are produced.

In the study of physics we have learned that there are ether waves both longer and shorter than those of the colored spectrum, but that the retina is insensible to them.

Velocity and Direction of Light Waves.—Through a homogeneous medium, i. e., a medium of uniform density, light waves travel in a straight line from their source, and with a uniform velocity. The velocity of light in free space, as between the earth and sun, is in the neighborhood of 300,000 kilometers (186,000 miles) per second. When light passes from one medium into another of greater density, as from a vacuum into air, or from air into water or glass, its velocity is checked, and when it passes into a less dense medium, as from glass or water into air or into a vacuum, its velocity is increased. It is due to this alteration in velocity by variation in the optical densities of the media through which it passes that the phenomena of refraction are produced, and the construction of the microscope rendered possible.

Refraction of Light.—By the refraction of light is meant the bending or turning aside of light rays when entering or leaving optical media under certain conditions. When the circumstances are such that a light ray enters or leaves a transparent medium in a direction at right angles to the surface of the adjoining media, no refraction occurs, and the light ray continues on in a straight line, but with altered velocity.

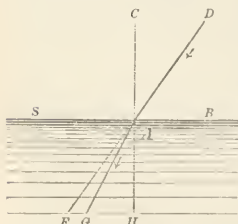


Fig. 1.—Refraction of Light.

When a ray of light enters or leaves a medium at any other than a right angle its direction as well as its velocity is altered, the amount and direction of the displacement depending upon the density of the medium and the angle which its surface presents to the incident ray. When entering a denser medium, the deflection is toward a perpendicular to the surface of the denser medi-

um, and when entering a less dense medium, the deflection is away from a perpendicular to the new medium. (Fig. 1.)

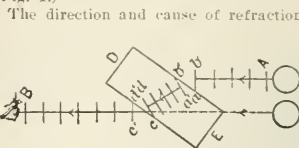


Fig. 2.—Illustrating Cause of Refraction.

um, and when entering a less dense medium, the deflection is away from a perpendicular to the new medium. (Fig. 1.)

The direction and cause of refraction may be understood by reference to Figs. 2 and 3. In these the long line represents the direction and the short cross lines the diameter of an advancing wave. When the wave front strikes the glass surface squarely, or at right angles, it suffers some retardation by the denser medium, but passes through without deflection. When, however, the light strikes the surface at an oblique angle the lower portion of the ray is retarded by the denser medium, while the upper side of the ray continues on with its original velocity, with the consequence that the ray suffers a partial rotation or turning about. When both the upper and lower portions have entered the glass they continue forward without deviation, since all parts are equally retarded, but when they reach the opposite side of the prism, the part of the ray which was last to suffer retardation is now the first through the glass and is therefore accelerated, while the lower portion is still retarded by the denser medium. The consequence is that the ray is still further rotated or turned from its original direction. By inspection of the dotted perpendicular line it will be noticed that the refraction is toward the perpendicular in the denser medium and away from it in the rarer one.

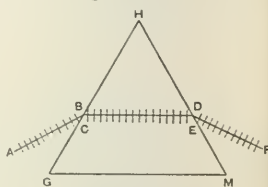


Fig. 3.—Illustrating Refraction by Prisms.

the lens has curved, while the prism has plane surfaces, but a curved surface corresponds theoretically to an infinite number of planes set together at their edges, so that the effect is the same in both cases.

Derivation of the Bi-Convex Lens.—The most important part of all instruments employed for the magnification of objects is the Bi-Convex Lens. Its relation to the triangular prism is illustrated in the figure, from which it is apparent that it corresponds essentially to two such prisms united at their bases. (Fig. 4.) It is true that



Fig. 4.—Relation of Prism to Concave and Convex Lens.

the lens has curved, while the prism has plane surfaces, but a curved surface corresponds theoretically to an infinite number of planes set together at their edges, so that the effect is the same in both cases.

Effect of the Bi-Convex Lens on Light Rays.—Since the bi-convex lens is strictly comparable to two prisms set base to base, it might be anticipated that it will affect light rays similarly to such a combination of prisms. By an inspection of Figs. 5 and 6 it will be observed that the effect is in both cases to bring light rays together at a point in line with the center of the lens, or with the bases of the prisms, or in other words, to converge them. It will also be noticed that prisms and lenses cause a bending of the light rays toward their thickest portion.

When the rays are parallel before striking a bi-convex lens the point to which they are refracted on the opposite side is known as the *principal focus* of that lens. If the rays originate at the principal focus, and are therefore divergent when they strike the lens, they will be parallel after passing through. If the divergent rays

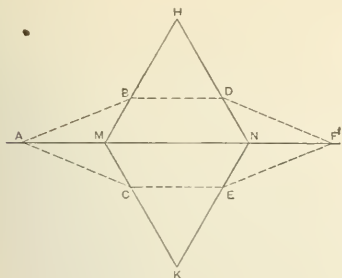


Fig. 5.—Convergence of Light by Double Prism.

originate at a point *outside or beyond the principal focus*, they will be converged by the lens and caused to meet at a point on the opposite side. Any two points thus related, so that the light rays from one are brought to a focus at the other, are known as *conjugate foci*.

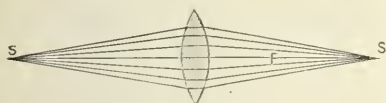


Fig. 6.—Convergence of Light by Convex Lens.

If the divergent rays originate *within or between the principal focus and the lens*, they will be divergent after refraction, but less divergent than before.

The straight line passing through both the principal focus and the middle of the lens is known as the *optic axis* of the lens.

What is Magnification?—A question which naturally suggests itself to the student is, Why does an object appear larger when viewed through a convex lens? This is commonly answered by the statement that the effect of a convex lens is to increase the visual angle, i. e., to increase the angle of the light rays coming from different points on an object. From the illustration (Fig. 7) it is

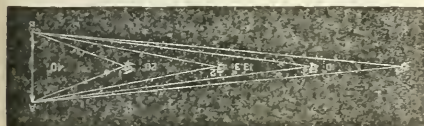


Fig. 7.—Effect of Visual Angle on Size.

evident that the angle subtended by the arrow increases as the eye moves toward it, with an apparent increase in the size of the object. The part played by the lens is to increase the size of the angle artificially by means of the property of refraction.

By increasing the angle of the rays before they enter the eye, they cross earlier within the vitreous humor and consequently the image projected upon the retina is larger. An image formed without the aid of a lens may cover too small a space on the retina to excite the sensation of sight, but by the interposition of a lens a larger retinal surface is covered, and the object becomes visible.

Designation of Magnifying Power.—Magnifying power, or *amplification*, as it is frequently called, is expressed either as *diameters* or as *times*, the former method being preferable. When it is said that a given lens magnifies an object one hundred diameters it is understood that its apparent length or breadth as seen through the lens is one hundred times its real length or breadth. "Times" refers to the apparent increase in area, and is equal to the

square of the number of diameters of amplification. The latter method of designation is sometimes followed by unscrupulous dealers in selling their goods to the unsophisticated, as it sounds bigger to say that an instrument magnifies ten thousand times than that it magnifies one hundred diameters.

Dispersion of Lenses. Chromatic Aberration.—Ordinary lenses have another effect upon light waves, that of *dispersion*. The shorter waves being more retarded by the glass than the longer ones, are therefore brought more quickly to a focus, and as a consequence an image seen through such a lens would appear surrounded by a circle of rainbow colors. This phenomenon is known as *chromatic aberration*. The best method of curing this defect of a lens is by taking advantage of the difference in the dispersive powers of flint and crown glass. The dispersive power of flint glass being nearly twice that of crown glass, a concave lens of the former is cemented to one side of a bi-convex lens of the latter (Fig. 8.) The dispersion caused by the crown glass is nearly or quite neutralized by that of the flint lens, with the result that a nearly colorless image is produced. A compound lens whose dispersion is corrected in this manner is known as an *achromatic lens, combination or system*.



Fig. 8.—Achromatic Lens.

Spherical Aberration.—The surface of a convex lens ordinarily corresponds to a portion of the surface of a sphere. On account of this sphericity, light rays from an object which fall upon the outer portions of the lens, strike the surface at a greater angle than those which fall nearer the middle. As the amount of refraction increases with the angle of incidence, it follows that the marginal rays will be brought more quickly to a focus than the central rays (Fig. 9), resulting in a blurring of the image produced. This defect is known as *spherical*

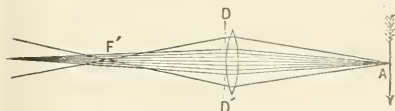


Fig. 9.—Spherical Aberration.

aberration since it results from the sphericity of the lens surfaces. Its correction lies in "flattening" or decreasing the curvature of the lens toward the margin, so that both marginal and central rays are brought to a focus as nearly as possible upon the same plane. A lens thus corrected is termed *aplanatic*.

Another method of correction is by means of a diaphragm. This is simply a thin piece of metal with an aperture in the center through which the middle rays are allowed to pass, while the marginal rays are cut off from the eye by the metal rim. This is not truly a correction, since it only conceals the defect of the lens without removing it, but is a much cheaper method than changing the surface of the lens.

Images Formed by Lenses.—The position and size of the image formed by a convex lens depend upon the location of the object. When the latter is placed *between* the lens and its principal focus, the image is on the same side of the lens as the object, erect and magnified (Fig.

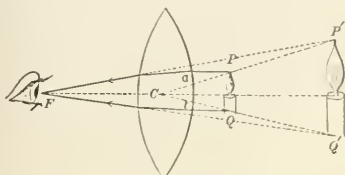


Fig. 10.—Object Within Principal Focus.

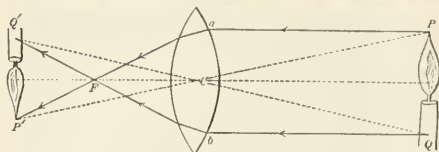


Fig. 11.—Object Beyond Principal Focus.

10.) Such an image is of course *virtual*, as it has no real existence.

If the object be moved farther away from the lens the image seems to approach the lens and grow smaller. When the object is moved *beyond* the principal focus, the virtual image disappears and a *real* image is formed on the opposite side of the lens. (Fig. 11.) This image is inverted and of a size depending upon the distance of the object. Increasing the distance of the object from the lens decreases the size of the image, and vice versa.

Focal Length of Lenses.—The distance from the principal focus to the middle of a bi-convex lens is known as the *focal length* of that lens. This may be found for a simple lens by holding it near a white wall so as to project upon it an image of a window or lamp located at the other side of the room. By moving the lens to or from the wall a point is found where the image of the window or lamp flame is brightest, and this distance measured in inches or millimeters is the focal distance or focal length. The greater the convexity of the lens the less will be its focal distance, or the distance at which it must be placed from the object which it magnifies.

THE YEAR IN CHEMISTRY.*

The field of inquiry in chemical science this year has been somewhat broad. Alchemy has been revived and hot has been the pursuit after a solvent for carbon which shall yield on evaporation or solidification carbon in the pure crystalline form of the diamond. Professor Crookes, who has recently paid a visit to the Kimberly fields, is led to think that iron at a high temperature and under great pressure will serve, and has served probably in Nature, as the long-sought solvent for carbon and will allow it to crystallize out on cooling in the form of the diamond. This view is confirmed by experiments in the laboratory, in which carbon has been dissolved in iron at the high temperature of the electric furnace, the mass on cooling actually yielding microscopic diamonds of beauty and luster equal to the natural gem.

Revival of Alchemy.

The transmutation of metals is said to have been effected by simply applying enormous pressure and conducting the operation in extreme cold. The announcement came from America, where it was stated that a chemist converted silver—Mexican dollars he preferred—into a mixture containing a large proportion of gold. The product known as "argentaureum" is advertised for sale as a curiosity at the price of 75 cents per gram. "It may be had in sheets." A mixture of gold and silver at this price is a costly thing. Pure gold is cheaper, while there is no guarantee, it seems to us, of "argentaureum" having been actually produced in the way described. Experts have of course rejected this announced achievement, but the case is of interest in showing that alchemy is still considered a practical possibility. Prout's hypothesis, which holds that the elements are different elaborations of the same primordial substance, is largely responsible for this belief, and curiously enough, just at this time many researches on the rare elements are

tending to establish the correctness of the materia prima theory. Correct as the conjecture may be, the agencies which effect the translation of one element to another are unknown to us and possibly will remain forever unknown, or at any rate beyond our power to employ. The elaboration of seventy different elements from the same elementary substance as starting-point is probably the work of ages and ages, just as the development of man has been. Mendeleff's beautiful periodic law leads again to the conclusion that the elements are after all entities of the same elementary body. Recent researches have shown, more especially with the rarer elements, that the atomic weight, which is a function of the atom, appears in certain cases to waver between two values as though doubtful as to what properties to exhibit and therefore as to what element it shall be.

Argon and Helion.

Professor Ramsay has continued his researches on the bodies argon and helion, but beyond what is already known he has found it difficult to declare any new properties except of a negative character. He has found, however, that helion may apparently be split up by means of diffusion into two bodies of varying density. The only widely distributed element that has until quite recently resisted all attempts at liquefaction is that remarkable element fluorine, but not only has it now been obtained in the free state, but liquefied into a clear, sherry-colored liquid. Thus the nearest approach to the properties of the universal solvent of the alchemist has been realized, for fluorine attacks at ordinary temperatures all known substances. But, as Professor Moissan and Professor Dewar have recently shown, fluorine, which has the most powerful chemical activity of all the elements, may be held in abeyance by preparing it at exceedingly low temperatures. Caution, however, takes fire on the surface of the liquid thus obtained, running about like sodium on water and giving a very intense light. Further developments of this achievement will be watched with considerable interest. In the meantime considerable credit is due to Professor Moissan and Professor Dewar for successfully accomplishing a most hazardous experiment. We have often expressed wonder that in Professor Dewar's classical experiments on the liquefaction of air he has not encountered argon and perhaps helion, since for the purpose of liquefaction a very large volume of air is dealt with. Apparently failing to separate argon or helion in air Professor Dewar soon detected an impurity, if we may so regard it, in a sample of gas evolved from the Bath spring. He found it possible by liquefaction to separate helion as gas when it is only present to the extent of a thousandth part. By this means it is probable that a good yield of helion will be obtained. In this experiment apparently no argon was separated, so that the conclusion is that argon liquefies simultaneously with the air.

Carbonic Acid and Ozone in the Air.

A note on the distribution of carbonic acid in the air has been made by Professor Carleton Williams. Contrary to what is commonly accepted—namely, that the carbonic acid of respiration is equally diffused through the air of a room—this investigator found that the air near the ceiling is generally the worst in this respect. In other words, the distribution of the carbonic acid in the air of an inhabited room is not uniform, and as a matter of fact the air near the ceiling of the room, especially if it be lofty, is as a rule appreciably less pure than the air four or five feet above the floor. The question of the quantity of, and the part played by, ozone in air is an important one, and some interesting work has been done in this direction. M. Maurice de Thierry, for instance, has made the interesting observation that the quantity of ozone increases with the altitude. His experiments were conducted at varying heights on Mont Blanc. It is

* THE (London) LANCET, Dec. 25, 1897.

well known that as the altitude increases so does the number of micro-organisms diminish, and this after all is what might have been anticipated, since ozone cannot exist long where easily oxidized matter occurs, nor is ozone favorable to the existence of micro-organisms. These observations may have an important bearing upon the hygiene and climatology of high altitudes.

Important Micro-Organisms.

During the past year we have more than once recorded the important rôle played by micro-organisms in the development of quality in many articles of consumption. It has thus been demonstrated that the flavor of tobacco or a cigar is due to the operation of a specific micro-organism, and that if the growth of this particular species could be induced a product of constant and agreeable qualities would always be obtained. The probability of this process being adopted on a commercial scale has at least been demonstrated in the case of butter. Thus a species of bacterium has been isolated which may be used with extraordinary success in the production of good-flavored butter. In this way cultures may be employed which will ripen a cream and produce generally better butter than the same cream ripened in the usual way. This affords an admirable illustration of the fact that in the countless number of ubiquitous microbes we must reckon with friends as well as enemies.

Coal-Tar Chemistry.

Organic chemistry proceeds apace, although on the score of importance it does not on the face of it appear to have accomplished much the past year that is intimately concerned with the advances of medical science. More coal-tar derivatives and synthesized compounds have of course been added to the list of medicaments, most of which have been of the antipyretic type. Much as the continual addition of antipyretics may be discounted, yet there is a redeeming feature connected with the enthusiasm of the chemist in searching for new compounds of this order, since in so doing he is adding considerably to our knowledge of the constitution of compounds and thus enabling us to remark the specific therapeutic differences existing between compounds of different yet of definite structure.

THE CALCIUM CARBIDE INDUSTRY.

Calcium carbide and acetylene gas, says Engineering, still continue to rival bicycles and incandescence mantles in their attractions for the genus "inventor" of this and other countries. In the first half of last year there were no less than 117 applications for patents dealing with the apparatus for the production or utilization of calcium carbide and acetylene gas. These numbers must not be taken too seriously. One may very safely assume that at least 300 of the 400 and odd patents which have been granted are absolutely valueless. In Germany, where the validity of patents is settled in the Patent Office, and not in the law courts, as in our own country, a struggle is at present being carried on concerning the validity of the patent covering the production of calcium carbide in the electric furnace. This master patent was granted to Bullier, a French chemist and assistant to the noted Moissan, whose experiments upon the products of high temperature reaction in the electric furnace have become classic.

Although the German carbide manufacturers are stated to have entered into treaty for the purchase of this German patent from the syndicate who hold it, the question as to validity is still unsettled.

In view of the large number of patents that exist bearing upon calcium carbide and acetylene, and of the exaggerated ideas that have been fostered concerning the future of the latter as an illuminating agent, it is not surprising that the craze for company promotion which marked the rediscovery of the compound in 1893 has continued. At least twelve new companies have been

registered during the last twelve months, having as their object the production or exploitation of calcium carbide or acetylene gas. The nominal capital of these companies is over \$2,750,000, and it would be exceedingly interesting to know what proportion of this has actually been subscribed by the general public, and also what is the amount of cash that has found its way into the pockets of patentees and company promoters connected with these twelve companies. Of this total, four are in our own country (England), but, as far as we know, not one of them has started to manufacture carbide.

The number of factories where carbide is at present produced is estimated at seventeen; only one of these is in this country—that owned by the Acetylene Illuminating Company, and situated at Foyers, Scotland. Most of these factories are only producing carbide upon a small scale, and in several cases the manufacture is simply a secondary one, taken up temporarily because the price of carbide is still inflated, and the production offers more profit than the ordinary manufactured product of the works. When the industry has settled down on a firmer basis, these factories will, possibly, drop the manufacture. With regard to the output of carbide per electrical horse power day, and to the cost of production, some of the earlier estimates are held to have been too favorable, and it is now believed that the output will not average more than nine pounds of carbide per electrical horse power day, and that the cost will be about £10 per ton.

As regards the use of acetylene or of calcium carbide there is little progress to report. The instances in which acetylene is being regularly used as an illuminant, i. e., other than for experimental or advertising purposes, are very few. The majority of recent patents have related to generators for the production of acetylene gas from calcium carbide. The reaction between the water and the dry calcium carbide is extremely violent, and in one of the earlier forms of generator much advertised and sold, the apparatus on newly charging always produced an escape of gas into the atmosphere. This defect is said to be avoided in some of the later forms. A certain and ready detector for this defect in generators is one's nose; for acetylene rivals sulphuretted hydrogen gas in the objectionable character of its odor. A recent patent proposes to avoid this difficulty by casting the carbide into sticks, and by then soaking these in naphtha or in heavy hydrocarbon oils. Acetylene has recently been experimented with as a lighting agent for trains in France and Germany, and it was stated not very long ago that the authorities in the latter country had ordered sixty tons calcium carbide for experimental purposes.

Prof. Vivian Lewes has recently discussed the application of acetylene as a ship's illuminant, and Warren has suggested the use of calcium carbide as a reducing agent in metallurgical operations. By heating together calcium carbide and metallic oxides he has obtained the metals or alloys of the metals with calcium. The present market for carbide is chiefly due to the demand for experimental or advertising purposes, and a legitimate demand for this much boomed product can hardly yet be said to exist.

With regard to the properties of gaseous and liquid acetylene there have been a considerable number of facts published lately, and some useful information has also been given concerning the precautions which it is necessary to take in dealing with acetylene in either form. A few of the more interesting of these are given below. Acetylene does not combine with the hemoglobin of the blood. It produces death when inhaled, simply by asphyxiation. If a vessel containing liquid acetylene be allowed to receive a blow, or to fall from a height of six meters to the ground, explosion with actual combustion of the acetylene will occur; if, however, the liquid acetylene be detonated by means of an incandescent platinum wire, a mere resolution of the acetylene into its

elements, carbon and hydrogen, without combustion, occurs. The pressure generated in the former case is said to be equal to 5,564 atmospheres. If too little water be used in the generators when producing acetylene gas from the carbide, the heat of the reaction between the latter and the water may rise so high that an explosion will occur. The acetylene generated from commercial calcium carbide is always impure, and it should certainly be purified before use, especially if it is to be stored in a gas holder for any length of time. Phosphuretted hydrogen, its most dangerous impurity, can be removed by passing the acetylene through scrubbers containing solutions of metallic salts.

Pictet recommends that the gas should be passed successively through calcium chloride solution, a lead salt solution, and sulphuric acid at -16° C., if it is to be compressed or liquefied for storage purposes. A much safer method of storing is, however, to use acetone for absorbing the gas. This chemical absorbs twenty-five times its own volume of acetylene at the normal temperature and pressure, and 300 times its own volume of the gas at a pressure of twelve atmospheres. If acetylene is to be stored in an ordinary gas holder, brine should be used in place of water for sealing the apparatus, since the gas is practically insoluble in the former. Acetylene is inferior to benzene in economy as an enricher of coal gas. The consumptions of acetylene and coal gas per candle power hour in various types of burners are as follows:

Acetylene.....	0.0227-0.282 cu. ft.								
Coal gas.....	<table> <tr> <td>Non-incandescence burners.</td><td>Bat's wing.....0.406 "</td></tr> <tr> <td></td><td>Argand.....0.353 "</td></tr> <tr> <td>Incandescence burner.</td><td>Siemens.....0.130 "</td></tr> <tr> <td></td><td>Auer's.....0.095 "</td></tr> </table>	Non-incandescence burners.	Bat's wing.....0.406 "		Argand.....0.353 "	Incandescence burner.	Siemens.....0.130 "		Auer's.....0.095 "
Non-incandescence burners.	Bat's wing.....0.406 "								
	Argand.....0.353 "								
Incandescence burner.	Siemens.....0.130 "								
	Auer's.....0.095 "								

These figures show how remarkably the introduction of incandescence lighting has improved the position of coal gas as an illuminant, and how difficult it will be for acetylene to displace the latter, except in those places where the price of coal gas is abnormally high. The incandescence principle has now been applied successfully to oil lamps. This fact still further handicaps the progress of acetylene as a lighting agent, since it is largely robbed of its most distinctive feature—its brilliancy—by the improvement in gas and oil illumination obtained by the application of the incandescence principle to burners and lamps. The high illuminating power of the acetylene flame is stated to be due to the exceedingly high temperature of the carbon particles; this temperature is believed to be nearly $4,000^{\circ}$ C.

CHANGE IN VOLATILE OILS.—It has been observed by Haenschel, that oil of angelica distilled from fresh root has a lower specific gravity and a stronger dextro-rotatory power than oil distilled from dried root. Angelica oil prepared free from terpenes has a still higher sp. gr. than the oil from dried root and turns the plane of polarization to the left, while the separated terpenes are correspondingly lighter and polarize strongly to the right. This is illustrated by a table:

	Sp. gr.	Polarization.
Oil from fresh root.....	0.8360	+ 36.5°
Oil from dried root.....	0.882	+ 2.6°
Oil, terpene-free.....	0.9597	— 5.21°
Terpenes.....	0.8545	+ 28.79°

The author concludes that in drying angelica root the hydrocarbons (terpenes) volatilize first, while the oxygenated portions volatilize more slowly. (Sudd. Ap. Ztg.).

—J. H. Redsecker, of Lebanon, Pa., recently read at a meeting of the Lebanon County Historical Society, a very interesting paper on "The Hebron Moravian Diary During the Revolutionary Period." The paper was full of incident and description, and required some five and one-half columns in the local daily for its publication.

TESTING OF ESSENTIAL OILS BY A SIMPLE METHOD.

For the examination of ethereal oils Duyk (Bull. de Ph. de Bruxelles) recommends Maumené's reaction because of its simplicity and ready application as follows: Into a prescription vial of 15 cc. capacity place 4 cc. of liquid paraffin and 2 cc. of the oil to be tested, mix them by rotating, and let 2 cc. of concentrated sulphuric acid run along the walls into the bottom of the vial. Close with a perforated cork holding a thermometer, which dips into the liquid. Note the temperature, then shake to mix the acid with the oils and note the highest temperature reached during the ensuing reaction. Subtract the lower from the higher temperature, which gives the increase due to the reaction. The author obtained the following results:

	Degrees C.
Cymene.....	4
Pinene.....	36
Limonene.....	36
Carvone.....	26
Thymene.....	24
Cedrene.....	15
Anethol.....	22
Thymol.....	7
Safrol.....	33
Carvacrol.....	4.5
Apioi.....	27
Eugenol.....	27
Geraniol.....	31.5
Menthol.....	9
Isobutol.....	38
Eucalyptol.....	22
Terphenol.....	26
Santalol.....	33
Chiral.....	40
Anisaldehyde.....	14
Benzaldehyde.....	9
Menthone.....	11
Chloronellone.....	33
Carvyl.....	30
Sandalwood oil (West Indian, self prepared).....	25.5
Sandalwood oil (West Indian, purchased).....	25.5
Sandalywood (East Indian).....	15
Oil. Cedar.....	16
Bals. Copalve.....	24
Gurganbalsam.....	21
Oil. Menthae (Mitcham).....	16
Oil. Menthae (Siam).....	13
Oil. Menthae (Jap.).....	20
Oil. Menthae, Crispae.....	26
Oil. Lavandulae (French).....	34
Oil. Lavandulae (Engl.).....	37
Oil. Rose (Turk.).....	34.5
Oil. Gerani.....	24
Oil. Chiri.....	25
Oil. Aurantii (Orange).....	23
Oil. Aurantii flor.....	38.5
Oil. Pettigrains.....	33.5
Oil. Thymol Rubr.....	23.5
Thymol Rect.....	23.5
Oil. Eucalypti.....	24
Oil. Caryophylli.....	28
Oil. Amyg. Amar.....	3.5
Oil. Aurantii (Ceylon).....	27
Oil. Cinnam. Cass.....	14
Oil. Carvi (French).....	28
Oil. Carvi (German).....	30
Oil. Camph.....	17
Oil. Anisi.....	17
Oil. Anisi Stellati.....	21
Oil. Foeniculi.....	19.5

It is advisable to put sample and reagents into a room to equalize the temperature before admixture. The addition of liquid paraffin is for the purpose of preventing a too violent reaction, which with some oils might cause combustion. (Ap. Ztg.)

ISOLATION OF RICIDIN.—Dried sprouts of Ricinus communis are extracted with 95 per cent. alcohol, the alcohol distilled off and the residue taken up with water; the solution then treated with lead acetate. After removing the excess of lead, the filtrate is concentrated by evaporation, which causes ricidin to separate in crystals. Ricidin ($C_{17}H_{15}N_3O_3$) is not precipitated by mercuric nitrate or chloride, or by silver nitrate. It is soluble in dilute soda solution only when heated, and evolves, when warmed with potassium dichromate and dilute sulphuric acid, a strong odor of hydrocyanic acid. It is present in the sprouts in considerable quantity. (Ph. Post.)

ÆTHACOL is a trade name given by Kalle & Co. to pyrocatechinmono-methyl ester.

BOARD OF PHARMACY OF THE CITY OF NEW YORK.*

QUESTIONS ASKED AT THE FEBRUARY 21 MEETING.

MATERIA MEDICA.

1. Give the official names of 2 Chlorides, 2 Iodides, and 2 Oxides of Mercury:
2. Give the botanical name of Buckthorn Bark:
Is the official preparations:
3. Is Oleum Copaiba a volatile or a fixed oil?
From what is Oleum Copaiba obtained?
4. What is Ceteacum?
b From what is Ceteacum obtained?
5. Give the definition of a gum-resin:
b What is an Oleoresin?
6. Give the botanical name of Hemlock:
b Name the official preparations and their doses:
7. Name five Antipyretics:
8. What is Asafetida?
b Give the source from which Asafetida is obtained:
- c Name the official preparations and their doses:
9. Name two official drugs Natural Order Urticaceae.
10. Give the botanical name and habitat with official title of each of the following drugs:
b Bitter Orange Peel, d Boneset,
c Chestnut Leaves, e Calabar Bean;
11. What is the source from which Salicin is obtained?
12. Give the composition of Compound Jalap Powder:
13. What is Arsenic?
b Give its source and some of the tests for it:
c Name the official preparations and their doses:
14. What is Phytolacca Radix?
b Give the official preparations and their doses:
15. Give the common names of the following:
a Eupatorium, b Convallaria, c Calendula,
d Apocynum, e Geranium.

TOXICOLOGY AND POISOLOGY.

1. Define—(a) a Narcotic Poison. (b) a Corrosive Poison.
2. Define an Antidote (b) State two different ways in which antidotes may act.
3. What is the largest dose of Carbolic Acid that may ordinarily be safely taken?
(b) What is the best antidote for Carbolic Acid?
(c) Why is it an antidote for Carbolic Acid?
4. By what symptoms are the effects of an overdose of Belladonna or its alkaloids recognized? (b) What is the proper emergency treatment for Belladonna poisoning?
5. What emergency treatment should be employed for poisoning by arsenical preparations?
6. What is the dose of Tully's Powder? (b) What is the chief poisonous ingredient of Tully's Powder?
(c) What is the largest dose that may ordinarily be given with safety?
7. What is the poisonous constituent of—(a) Cherry Laurel Water? (b) Tartar Emetic?
8. What proportion of the adult dose of a medicine should ordinarily be given for the following ages—(a) 1 yr. (b) 2 yrs. (c) 4 yrs. (d) 6 yrs. (e) 12 yrs.?
9. What does the law require of a pharmacist when selling a poison enumerated in—(a) "Schedule A"? (b) "Schedule B"?
10. What is the dose of—(a) Camphor? (b) Sulfonal? (c) Cresote? (d) Guaiacol Carbonate? (e) Apomorphine Muriate?
11. What is the dose of—(a) Caffeine Citrate (b) Tr. Belladonna? (c) Atropine Sulphate? (d) Mercuric Chloride? (e) Chloral Hydrate?
12. What is the dose of—(a) Santonin? (b) Salicin? (c) Pancreatin? (d) Azaricin? (e) Resorcin?
13. What is the following prescription be dispensed?
R Strych. Sulph. gr. ss
Potass. Brom. ʒv.
Syrupi ʒi
Aque, q. s. ad ʒiv
M. Sig. A teaspoonful three times a day.
(b) Upon what ground does the pharmacist base his action?
14. What the following prescription be dispensed?
R Liq. Morph. Sulph. ʒi
(Mazecide)
Elix. Simp. ʒxi
M. Sig. A teaspoonful every hour until pain is relieved.
(b) How much Sulphate of Morphine would be taken in four hours?
15. What is the dose of (a) Podophyllin? (b) Oleoresin of Aspidium? (c) Potassium and Sodium Tartrate? (d) Infusion of Digitalis? (e) Wine of Antimony?

PHARMACY.

1. How does "Colation" differ from "Filtration"?
2. What class of official preparations represent the active principle of a drug "volume for weight"?
3. Name three official preparations containing Ammonia Gas, and give the % present in each case.
4. Give official title for "Carron Oil" and how it is prepared?
5. What would you dispense if "Liquor Ferri Persulphatis" were called for?
6. What is the object of adding Hydrochloric Acid in making Lunar Caustic?
7. Name the active constituents of "Acidum Carbolicum Crudum."
8. What poisons compound is present in true Oil of Bitter Almonds?
9. Name three tests which serve to distinguish Phenol from Cresote.
10. Give a brief outline for preparing official Syrup of Ferrous Iodide.
11. You have a call for an Arsenic antidote. What official preparation would you dispense?
12. Chloroform. Official title. From what source obtained. Decomposition products when exposed to sunlight, and its official preparations?
13. Give the % strength of the following, viz.:
A. Alcohol. B. Chlorine water.
C. Dilute Acetic Acid. D. Dilute Hydrocyanic Acid.
E. Tincture of Opium.
14. Name at least three incompatibles of "Antipyrinum."
15. Criticise the following prescription:
R Calomelanos Gr. II
Sacch. Lact. Gr. V
Antipyrin Gr. IIII
Misce. Fiat Pulv. Dent. Tal. Dos. No. XII.
S. One at night.

CHEMISTRY.

1. Show by an equation what reaction occurs in making "Lime Water" U. S. P.
2. Give the name of the following:
A—H₂O₂ B—HNO₂ C—K₂NaC₂H₃O₆ D—H₂PO₄ E—O₃
3. When carbonate of magnesium is calcined, what gas is given off and what compound is left?
4. Complete the following reactions:
A—HGO + 2HNO₂ B—K + H₂O C—AGNO₃ + NaCl
D—BaCl₂ + H₂SO₄ E—PbNO₃ + 2KI
5. Carbon: Give symbol. Atomic weight. Valence. Occurrence and properties.
6. Write the chemical formula of the 2 oxides of carbon.
7. Show by equation what occurs when an acid is added to KHCO₃.
8. Give two tests of identity for (A) Ferrous salts, (B) Ferric salts.
9. What happens in a mixture containing Iodide of Potassium and a decomposed sample of Spirits of Nitrous Ether?
10. Write the chemical formula for:
A—SODA B—BORAX C—GLAUBER SALTS D—BLUE
VITRIOL E—WOOD ALCOHOL.
11. Show by an equation how Hydriodic Acid can be prepared, and in what official preparation it is found.
12. Give a test of identity for iodine.
13. State what happens when Alum is added to impure drinking water.
14. What acid of Phosphorous is formed when 3H₂O is added to P₂O₅?
15. Lead: Give symbol. Valence. Occurrence and formula of the official oxide.

NEW DERIVATIVES OF IODOFORM.—A number of additional products of iodoform with quaternary sulphur compounds can be prepared by mixing solutions of the components in molecular proportions. The following have been patented by the Farbenfabriken in Elberfeld: Iodoform-tri-ethyl-sulphonium iodide; crystallizes in plates melting at 142° C.; closely resembles iodoform in appearance. Iodoform-tri-methyl-sulphonium iodide; in form of light-yellow needles; melts at 162°. (Südd. Ap. Ztg.).

*The questions are reprinted without correction of errors in grammar, Latin and typography.—Ed.

—The physicians of Louisville, Ky., object to an ordinance proposed, which provides that all physicians, druggists, lawyers and veterinary surgeons shall pay a license.

PHARMACY.

LUPETAZINE, or di-methyl-piperazine, is a white, crystalline powder, recommended as a substitute for piperazine.

MENTHALCAL is a preparation in tablet form, composed of the salts contained in the mineral springs at Ems, combined with menthol. (Ph. Post.)

SALICYL-ACETIC ACID is, according to Limpach, of great value as an antiseptic. It is prepared by treating the sodium salt of ortho-oxy-benzamide with mono-chloroacetate of sodium and saponifying the product of the reaction with soda solution. (Ph. Post.)

PREPARATION OF DOUBLE SALTS OF LITHIUM AND PIPERAZINE.—Acid salts of piperazine with certain di-basic acids, as oxalic or tartaric acid, are prepared by mixing solutions of acid and base in molecular quantities and the solutions neutralized with lithium carbonate. (Ap. Ztg.)

STRYCHNINE HYDRIDE is obtained by the action of metallic sodium on strychnine in a boiling alcoholic solution. Its physiological action is in every respect the opposite of that of strychnine, and it may, therefore, be used as a physiological antidote in strychnine poisoning. It resembles morphine in having a similar paralyzing action. (Ph. Post.)

STERILIZATION OF IODOFORM WITH PARA-FORMALDEHYDE.—According to a recent German patent (Chem. Ztg.), iodoform is sterilized by mixing it with either the solid, polymerized formaldehyde (para-formaldehyde, or tri-oxy-methylene) or with a solution of formaldehyde, and subsequently evaporating the solvent, which leaves para-formaldehyde in the iodoform. (Ap. Ztg.)

INK FOR LABELING BOTTLES.—Ink which adheres to glass and takes the place of the paper labels on bottles, etc., is prepared as follows, according to the Werkstatt (Sci. Am.): Take 20 grammes of brown shellac, which is dissolved in 150 cubic centimeters of lamp spirit; then prepare a solution of 35 grammes of borax in 250 cubic centimeters of distilled water and pour the first solution slowly into the second. Now a dyestuff has to be added to the product received; for this 1 gramme of methyl violet is well suited. The ink prepared in this manner is said to be indestructible.

DIURETIC ACTION OF BIRCH LEAF INFUSION was first observed by Winternitz. Moreau, a French pharmacist, conceived the idea of making the infusion alkaline to extract the resin-like betuloretinic acid. An infusion so prepared (10 to 15 gm. of birch leaves, 1 gm. of sodium bicarbonate and a liter of water) showed the diuretic action much more decidedly. It has at times also a laxative effect. Instead of an infusion the alcoholic extract or fluid extract may be used, the latter in doses of 1.5 to 2.5 gm. (25 to 35 grains) daily. (Sädd. Ap. Ztg.)

TO COLOR BRASS SURFACES BLACK, the following is recommended: 20 gm. of copper carbonate are dissolved in 150 cc. of 10 per cent. ammonia water and when solution is complete 30 cc. of water added. The brass objects to be treated are immersed in the solution for a few minutes, then washed off and dried. Instead of this solution, a solution of nitrate of silver or copper in water may be painted over the warmed brass surfaces. After complete drying of the coating, the objects are brushed off and subjected to the action of sulphuretted hydrogen, which colors them deep black,

through formation of a layer of the sulphide of silver or copper. (Ap. Ztg.)

MERCURIAL OINTMENT SOAP.—This preparation is, according to Unna (Monatsh. f. pr. Dermat.), unjustifiably neglected by dermatologists. It contains a soap base, prepared by boiling potash solution with lard, to which 5 per cent. of benzoated lard is added and one-third of its weight of mercury incorporated. This preparation is claimed to be more effective than ordinary mercurial ointment, 4 gm. of the former being equivalent in effect to 6 gm. of the latter. It is used in quantities of 1 to 3 gm. (15 to 45 grains) daily, in extreme cases up to 4 gm. (60 grains). The soap is compatible with all kinds of diluting and modifying additions, such as soft soap, zinc paste, zinc ointment, etc. (Ap. Ztg.)

A PROFITABLE WINE TRADE.—In a recent lawsuit which has been brought against an alleged importer of Hungarian wines, on account of a business quarrel, the fact has been brought to light that a supposed high grade of Tokay wine which the "importer" sold for medicinal purposes was manufactured in New York at a trifling expense. The plaintiff in the suit claims that for the past five years he has supplied the defendant with this Tokay, which he manufactured out of alcohol, water, farina water, honey, tokay essence, citric acid, salicylic acid and gelatine. The cost of making six hundred gallons of "Tokay" wine, he states, is about \$75, or at the rate of six cents a bottle. The price of the wine to the public was two dollars a bottle.

SALOPHEN IN INFLUENZA AND HEADACHE.—This remedy has in recent times become very popular. One reason for its advantage over most other preparations used for similar purposes is its harmlessness. Its action in headaches, facial neuralgia, nervous toothache, etc., is, as a rule, rapid. In nervous headache, 1 gm. (15 grains) is given, stirred up with water or in wafers, and another dose of 1 gm. an hour later. In influenza it is most effective in doses of 1½ gm. (8 grains), given repeatedly at intervals of 2 or 3 hours, preferably in carbonated mineral water. To prevent relapse, it should be continued in small doses during recovery. In influenza epidemics, small doses of salophen have been found an effective prophylactic. (Ap. Ztg.)

ARTIFICIAL BLACK MARBLE is manufactured by a factory in Catania, which has patented the process in most countries. The artificial stone can be produced in any desirable form and size, resembling natural black marble to such a degree that it can hardly be told from it by the eye, and is much cheaper. Ordinary white sandstone is cut into the desired shape and size and the blocks placed into large iron tanks upon wire nets, so that they rest a few inches above the bottom of the tanks. Contact of the blocks with one another must be avoided. A hot, thin fluid, consisting of asphalt and coal tar, is then run in, in sufficient quantity to cover the blocks. The mixture is kept boiling for 36 hours, the stone then taken out, cooled and dried. The product withstands the action of air, heat and acids. In similar manner this factory manufactures brick from cement, sand and water. (Ap. Ztg.)

SUGAR IN MULLEIN FLOWERS.—Dr. Schneegans, while making periodical examinations of the urine of a diabetic patient, who had been put on a strict diet without carbohydrates, found for a few weeks no sugar, but suddenly a considerable amount was again noticed and continued with regularity, although the diet had not been changed. Inquiries brought to light that the patient regularly drank considerable quantities of strong mullein tea, which had been recommended him as a remedy for Bright's disease. This led the author to repeat

the experiments of Rebling, who had found 11 per cent. of sugar in mullein flowers, which would fully account for the sugar in the urine. Schneegans then found in various samples from 9.2 to 11.7 per cent. of invert sugar, and small, varying quantities of cane sugar, corroborating the results of Rebling. Traces of an alkaloid were obtained from the seeds. (Jour. de Ph., through Ap. Ztg.).

DOCTORED FOODS.—The British Trade Journal, Feb. 1, comments upon the fact that during the last few years there has arisen, chiefly as a result of extensive advertising, a growing sale in "doctored" or drugged food preparations. Certain useful food products are mixed with powerful drugs and tonics; and in this way what are really medicines are administered in conjunction with foods and beverages. So extensive does this system threaten to become that grave dangers may result. Instances are known in which such beverages, taken in the ordinary way, have had very unpleasant effects. The drugs swallowed are, of course, assimilated without regard to the individual constitution, or to quantities and stated periods, and the consequences to digestion and nerves may be serious. It must therefore be asked whether the sale of such productions should not be placed under proper restrictions; and whether, for instance, the Patent Medicine Act does not apply to them?

SOME COSMETICS.—The Seifen Fabrikant gives the following recipes:

Wash.—1 liter of distilled water; rice flour, $\frac{1}{2}$ pound; violet powder, 135 grammes; glycerine soap, 10 grammes; bergamot oil, 6 grammes; and iris oil, 5 grammes.

Skin Gloss.—Potash, 50 grammes; spermaceti, 56 grammes; rice flour, 500 grammes; benzoin powder, 20 grammes; bitter almond oil as required.

Toilette Glycerine.—Glycerine of 20° B., 2 kilogr. grammes; rose water, 2 kilogr. grammes; sodium bicarbonate, 30 grammes.

Athens Water.—Calcium carbonate, 70 grammes; saffra wood oil, 250 grammes; rose water, 4 liters; orange blossom water, 4 liters; spirit (96 per cent.), 1 liter.

Cold cream.—Almond oil, 500 grammes; white wax, 90 grammes; rose water, 280 grammes; bergamot oil, 2 grammes; lemon oil, 8 drops; rose oil, 2 grammes.

Castor Cream.—Castor oil, 500 grammes; almond oil, 160 grammes; lemon oil, 5 grammes.

A HYGIENIC FLOOR.—"It is well known," says "Revue Scientifique, (Lit. Digest)," that floors have been accused of grave sins. Recently, at the Academy of Medicine, Messrs. Vallin and Laveran have been conducting the prosecution. It is a fact that the ordinary floor retains in its cracks the most injurious dust and the most dangerous germs. These penetrate thence between floor and ceiling, where they can preserve their virulence for a long time. For this reason the cracks of old floors are often stopped up with paraffin or some similar substance. Sometimes, for greater economy, they are caulked. In new buildings they are often replaced with cement. But then people complain, for cement is very disagreeable to the feet. M. Capitan, in *La Medicine Moderne*, tells us of a new kind of floor that is really in the line of progress, if it proves to possess durability. We speak of wood pulp floors, which have no cracks. They are also bad conductors of heat and sound, and, in spite of their durability, are soft to the feet like, for instance, linoleum. The wood pulp is mixed with a small amount of cement to increase the resistance of the floor, the price of which is much lower than that of the ordinary flooring. The dried pulp is reduced to powder to facilitate transportation, and this, after being made into a gelatinous mass, is pressed between rollers. When the pulp is dry it is painted to imitate oak or other wood, according to taste."

PREPARATION OF IODINE DERIVATIVES OF ACETONE.—Methods for preparing several iodine derivatives of acetone, which may find application in medicine, have recently been patented. If iodine is added to an aqueous solution of acetone-di-carbonic acid and the mixture gently warmed, a reaction with evolution of carbon dioxide takes place. The reaction is made use of commercially by adding to the mixture a substance to counteract the disturbing influence of the hydriodic acid formed, preferably iodic acid. Differing with the proportions of iodine used, various products are obtained (per-iod, penta-iod, tetra-iod-acetone, etc.). Per-iod-acetone is a light yellow, crystalline powder melting at 78° C., and is converted by boiling with water into penta- and tetra-iod-acetone, with separation of iodine. Most organic solvents also separate iodine from it. Dilute soda solution decomposes it in the cold with formation of iodoform. The reactions of penta-iod-acetone are similar; it melts at 164°. Di-iod-acetone melts at 65° to 66°. (Ap. Ztg.).

THERAPEUTICAL VALUE OF SULPHOCYANATES.—It has been proved by Edinger that the human organism is protected from the ravages of some bacteria by certain aromatic amines produced within the body. In the secretions of the mucous membranes and salivary glands it is particularly potassium sulphocyanate which plays a prominent role in this system of self-disinfection. A. Rose (Dermat. Zentrabl.) has tested for their therapeutic value a number of the sulphocyanates that have a structure analogous to those in the body. The examination included the double sulphocyanates of quinine and zinc, oxy-quinoline and zinc, oxy-quinoline and bismuth, and quinine benzyl sulphocyanate. The last mentioned was found useful as a caustic in condylomata acuminata, being in this case much superior to formaldehyde, which causes violent pain. It was used in form of dusting powder several times daily. The oxy-quinoline and bismuth salt effected rapid healing of soft and hard ulcers. The quinine salt was effective as 5 to 10 per cent. ointment in some forms of herpes and eczema, but not in psoriasis. The other preparations above mentioned were found to be of little value. (Ap. Ztg.).

SOME EXAMPLES OF INCOMPATIBILITY.

The fact that many alkaloids and similar substances frequently give physiological results different from those expected, suggested to the "Ztsch. f. Krankend." a discussion of these conditions, including a consideration of those medicinal substances, that suffer rapid decomposition and molecular rearrangement and those subject to deterioration during the process of preparation. As examples are mentioned the admixture of silver salts and organic matters; of salicylates with vegetable or mineral acids; sterilization of morphine and cocaine solutions. Ointments are frequently entirely inactive, when containing metallic salts in addition to a salt of morphine or cocaine, as the alkaloids are always rendered insoluble by a slight excess of metallic salts. Simultaneous external and internal use of certain medicaments may also exert a disturbing influence on their action. If, for example, an oculist prescribes an ointment containing mercury and the patient takes potassium iodide internally, there will be a formation of mercuric iodide in the eyes, which considerably increases their inflammation. Quinine is not infrequently prescribed with substances containing tannin, an insoluble tannate of quinine being the result. Quinine is also slowly precipitated by potassium bromide. In the cases of iodine and bromine the reactions with quinine are not always simple, but at times these bodies enter directly into the molecule and change not only the structure, but also the physiological properties and are liable to change it even into toxic bodies. During the sterilization of morphine solutions

there is a liability (especially when the temperature is too high), of forming apo-morphine, an alkaloid of totally different therapeutical action. A similar change may take place under like condition in the sterilization of cocaine solutions. (Ph. Post.)

PETROLEUM AS FUEL ON RAILWAYS.—The editor of Engineering News (Lit. Digest), believes that petroleum is a fuel of too high a class to be used on railways. In answer to a correspondent who asks about the results of some trials made by the Pennsylvania Railroad, he says: "The most important result of the Pennsylvania Railroad tests, so far as our recollection extends, was that it was found, by a simple arithmetical computation, that if all the locomotives of the Pennsylvania system were to burn petroleum it would require something like the total production of the United States to supply them. There is no especial difficulty in the use of petroleum as a locomotive fuel, and it is in general use on some of the railways in Southern Russia, and in this country one or two roads in Southern California, where petroleum is cheap and coal is dear, are burning it. Under any ordinary conditions, however, the use of petroleum under steam boilers can only be of limited extent. It is a pity to use up the world's stores of this high-class fuel in such a way. Future generations, and very likely many now in active life will see the day when it will be a source of wonderment that such valuable gifts of nature as natural gas and petroleum should have been so recklessly wasted."

A NEW TEST FOR AMMONIA AND NITROGENOUS ORGANIC COMPOUNDS.—A very sensitive reagent for ammonia, ammonium salts, and all nitrogenous organic compounds which give off ammonia with strong alkalies, has been discovered in *p*-diazotitanillin by E. Riegler (Chem. Ztg.). The reagent is prepared by dissolving 1 gm. of titanillin in 20 cc. of water and 2 cc. of hydrochloric acid with aid of heat, adding 160 cc. of water and then 20 cc. of a 2.5 per cent. solution of sodium nitrite. After some time the solution becomes perfectly clear. If it becomes turbid on long standing, it is made serviceable again by filtration. The test is applied by shaking 10 cc. of the solution to be tested with 10 to 15 drops of the reagent and slowly adding 10 per cent. soda solution in drops. In presence of traces of ammonia, reddish-yellow clouds appear, the coloration ranging from reddish-yellow to red, according to the amount of ammonia present. On adding an excess of sulphuric acid, the liquid is decolorized and microscopical yellow needles come to the surface, which, when collected on a filter and washed with alcohol, give an intense purple color with soda solution. The reaction is also useful for detecting albuminoids and alkaloids. (Südd. Ap. Ztg.).

CASTILE SOAP.—Some interesting information concerning the identity of Castile soap was produced in a suit by certain importers who protested against the ruling of the local appraiser at the port of entry as to the rate of duty to be assessed. It appeared from the testimony of reputable dealers in soap that the merchandise in suit was a good medium quality of Castile soap, and belonged to a class of soaps which had been known in trade for many years by that name, and, like most of the Castile soaps of commerce, was made from a low grade of residuum olive oil, which had undergone treatment with sulphuric acid gas and distillation, known as "olive oil foots." Evidence was also adduced to show that all the soaps made from olive oil in any form except fancy, perfumed, or toilet soaps, or certain medicated soaps, are known in trade as castile soap, and there are also mottled and other soaps made in France from oils other than olive oil, and also from animal grease, and from what is known as washed oil, of lower price and of inferior quality to the articles in question, that are known in commerce as Castile soap, and have been so known for many years. The soap constituting the importation was held to be Castile soap and duty was assessed accordingly.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.
Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Queries From Non Subscribers not Answered.

(Robert McMahon, Indianapolis, Ind.) Read the heading at the top of this column.

Coloring Aqueous Solutions.

(L. J.) For red use cochineal color, solution of carmine, tincture or compound tincture of cudbear, N. F. For yellow use either tincture of saffron or curcuma. Green may be produced by the employment of chlorophyl.

Camphor Cream for Barber's Use.

(F. W. B.) Formulas Nos. 1, 2 and 3, under this title in this journal Feb. 3, 1898, page 175, are intended for lotions to be applied to the face after shaving. A little careful reading would have brought out this information. It is there.

Coloring Electric Light Globes.

(N. H. B.) The process generally recommended is to coat the globes with a thin solution of collodion, in which has been dissolved aniline of the required shade. For a general process for this kind of work see this journal Oct. 14, 1896, page 501.

To Cement Amber.

(E. S.) (1) Heat the surfaces and cement with boiled linseed oil. Shellac is also recommended. Clamp firmly.
(2) Melt mastic in linseed oil. Use hot.
(3) The Canadian Pharmaceutical Journal states that amber may be cemented by moistening the surfaces with solution of potash, and pressing them together.

Some Common and Official Names.

(D. A.) Fever-tree is one of the common names of *Eucalyptus globulus*, the leaves of which are official in the Pharmacopœia under the title "Eucalyptus." Poison oak and poison ivy are common names for *Rhus Toxicaria*, the leaves of which are official under the title "Rhus Toxicodendron." Dog buton is an old synonym for nux-vomica, the seeds of the strychnos nux-vomica. The official title is nux-vomica.

To Cement Glass to Polished Iron.

(S. & H.) One of the following may answer your purpose, although the first is not wholly impervious to alcohol:

- | | |
|---|----------|
| (1) Resin | 5 ounces |
| Yellow wax | 1 ounce |
| Venetian red | 1 ounce |
| Melt the wax and resin on a water bath and add under constant stirring the Venetian red previously well dried. Stir until nearly cool, so as to prevent the Venetian red from settling to the bottom. | |
| (2) Portland cement | 2 ounces |
| Prepared chalk | 1 ounce |
| Fine sand | 1 ounce |
| Solution of sodium silicate, enough to form a semi-liquid paste. | |
| (3) Litharge | 2 parts |
| White lead | 1 part |
| Work into a pasty condition by using 3 parts boiled linseed oil, 1 part copal varnish. | |

Haines' Sugar Test.

(F. R.) The solution known as Haines' Sugar Test is used as a reagent for testing glucose in urine. Here is the formula:

Copper sulphate	3 grams
Caustic potassa	9 grams
Glycerine	100 grams
Water	600 grams

Glucose causes a precipitation of red suboxide of copper.

Flashlight Powder.

(J. D.) See this journal, Oct. 14 and Nov. 11, 1897, pages 538 and 719. Here are some others:

(1) Magnesium powder	4 ounces
Potassium permanganate	4 ounces
Barium peroxide	2 ounces
(2) Aluminum powder	5 ounces
Antimony sulphide	1 ounce
Potassium nitrate	2½ ounces
Potassium chlorate	12 ounces
(3) Potassium chlorate	5 ounces
Potassium ferrocyanide	260 grains
Sugar	175 grains
Aluminum	2 ounces

"Poa de Milhommen."

(T. B. T.) has had calls from Portuguese customers for a bark called "Poa de milhommen" or "bark of a thousand men." He wants to know what is wanted. In the dispensatory the name "milbommen" is used as a synonym for a species of aristolochia (much used in Brazil). He has shown serpentaria (aristolochia serpentaria), but it is not what his customers want.

Dr. H. H. Rusby, to whom this query was referred, says he thinks it very likely the bark of Geissospermum, called in Brazil "Pao-Pereira," is what is wanted, although he has never known this bark to be called by the name mentioned. We would ask our correspondent to procure a specimen if possible and submit it for identification.

Balsam Gum.

(E. H. M.) You fail to submit the prescription calling for "balsam gum, 5j," and therefore we cannot form an opinion as to the substance the prescriber had in mind under this somewhat strange title. The term balsam, as at present understood, is inappropriately applied to the oleo-resin of ebies balsamea, to which you allude. There are also a number of so-called "gums" which are not gums at all, but resins, as "gum" guaiac, "gum" mastich, "gum" turpentine, etc. These substances, when mixed with volatile oils, as in Venice and common turpentine, are called oleo-resins; if they contain benzoic or cinnamic acid, either with or without volatile oils, they are called balsams, and if mixed with gums, they are called gum-resins. Benzoin, styrax, and Peru balsam are examples of the balsams, and gamboge, myrrh, galbanum and ammoniac—of gum-resins. Better consult the prescriber.

Manufacture of Beet Sugar.

(L. E. B.) The Department of Agriculture, Washington, D. C., and the agricultural experiment stations of the various States have published a vast amount of literature on the manufacture of beet sugar. A popular summary of information on the subject may be found in Farmers' Bulletin, No. 3, of the U. S. Department of Agriculture. Another bulletin (Farmers' Bulletin, No. 52) issued by the same department last year, is "The Sugar Beet; Culture, Seed Development, Manufacture and Statistics," by H. W. Wiley, Chief of the Division of Chemistry, and formerly Director of the Department Sugar Beet Experiment Station in Nebraska. You can probably secure the publications issued by the Agricultural Experiment Station in your own State (Iowa) by addressing the Director, at Ames, Ia. For the bulletins of the Department of Agriculture, address the Secretary of Agriculture, Washington, D. C.

Bleaching Hair With Hydrogen Peroxide.

(A. P. S.) For bleaching hair upon the head, the hair is previously washed to remove all grease, and the peroxide of hydrogen applied rapidly, care being taken not to touch the skin more than is unavoidable. By this operation yellowish tints are produced which, if carried too far, are likely to turn the hair gray. Applications of this nature may be expected to be injurious to the hair. Here is a formula for bleaching human hair not upon the head.

(1) Mix 1 pound hydrogen peroxide with 1 ounce of water of ammonia; mix 4 ounces hydrogen peroxide with 1 ounce of cream of tartar, dissolved in 1 ounce of soda. Blend the two solutions, and steep 1 pound of the hair in it for three hours. Then wash in clean water with soap in a bath of clay, and thoroughly dry. Repeat the process 15 or 16 times; but thoroughly mix and shake up the hair after the 12th and every succeeding time.

Foot Powder.

(E. W. H.) Most remedies recommended for fetid perspiration of the feet contain talcum with either salicylic or boric acid or both. Salicylated powder of talcum of the National Formulary is a preparation of this character. Here are some others from the Era Formulary:

(1) Oleate of zinc	1 ounce
Boric acid	2 ounces
Prepared talcum	2 ounces
(2) Salicylic acid	2.5 grams
Alum	5.0 grams
Starch	20.0 grams
Oil bergamot	10. drops
Alcohol	5.0 cc.
Mix and add	
Talcum	70 grams
(3) Dieterich gives this one:	
Salol	100 grains
Oil wintergreen	40 minims
Powdered talcum	10 ounces

We cannot give the formula for the proprietary article.

Dehorning Fluid.

(L. J.) There are several kinds of so-called chemical "dehorners," but nearly all contain potash in concentrated solution. The solution is thoroughly rubbed over the "button" of the horn in the young calf. Some time ago an agricultural exchange published the following method: "As soon as the buds of the horns appear and can be found on the calf, take a stick of caustic potash, and after moistening the horn with a little water, rub the exposed horn with the end of the stick of potash. This stick, being about the size of a lead pencil is very convenient to use, and can be slipped into a bottle for preservation, where it must be kept closely corked until again wanted. It takes but a single application to kill the young horns, and is painless." The various agricultural experiment stations throughout the country have published considerable literature upon the subject of dehorning cattle, as has the Agricultural Department at Washington. These contributions can generally be had for the asking, and we suggest you write for them.

Cannabis Indica: Indian Hemp.

(R. L. L.) writes: "A physician wrote for 'fluid extract apocynum cannabinum, Indian hemp.' It was to be mixed with equal parts of digitalis (no quantities given), a teaspoonful of the mixture put into ½ glass of water and a dose taken therefrom. The doctor wanted cannabis indica; the druggist dispensed black Indian hemp. Was not the druggist right, or was he supposed to know that the doctor was uncertain in his Latin and 'underlined' Indian hemp to help the druggist?"

This is not the first time a mistake of this character has occurred, and it is due to the fact that Indian hemp is a very common name for both apocynum cannabinum and cannabis indica. In this instance the physician was in error from the fact that apocynum cannabinum is

not the official title for *cannabis indica*, and it is the title for what is known quite well in this country as "Indian hemp." We hardly think though, that the drug-gist was justified in dispensing apocynum, even though there is nothing on the prescription to indicate that the prescriber wanted *cannabis indica* except the words "Indian hemp." Many writers on materia medica and therapeutics have advocated dropping entirely the term "Indian hemp," though it still receives official sanction as a synonym for *cannabis indica* (see U. S. P.). This is a case where it would have been wise to confer with the physician before compounding the prescription.

The Use of "Ph. D."

(H. W.) writes: Has a registered pharmacist the right to use the letters "Ph. D." after his name, or is that privilege given only to graduates in pharmacy? Also, what initials, if any, may a registered assistant pharmacist use after his name?

The letters "Ph. D." as generally understood stand for "Philosophie Doctor," a degree conferred upon individuals who have taken and completed a prescribed course at a legally incorporated educational institution empowered to grant degrees and, of course, a registered pharmacist or a graduate in pharmacy has no right to use the degree after his name unless he has had it conferred upon him. The degree "doctor of pharmacy" (Phar. D. or P. D.) conferred upon graduates by some colleges of pharmacy, should not be confused with the degree "doctor of philosophy."

There are no initials which the registered assistant pharmacist as such may call his own. He needs none. Name and fame are not made by these appendages. The employment of many titles may serve to secure a hearing for a "horse jockey" or traveling medicine fakir, but as a rule they don't count. The common people do not always understand them and it is sometimes embarrassing to be called upon to explain their meaning. If you must indicate your calling say "John Smith, pharmacist." What more honor is there in the drug business?

Florida Water.

(W. H.) We cannot give you a formula for the proprietary article. Some one of the following may answer your purpose:

(1) Oil bergamot	150 parts
Oil lemon	90 parts
Oil orange peel	60 parts
Oil lavender	105 parts
Oil cloves	15 parts
Oil cinnamon	15 parts
Oil orange flower	15 parts
Alcohol	18,000 parts
Distilled water	4,500 parts
(2) Oil lavender	4 ounces
Oil bergamot	1 ounce
Oil cinnamon	2 drams
Oil cloves	1 dram
Oil neroli	2 drams
Musk, pure	4 grains
Cologne spirits, 95%	1 gallon
Macerate 15 days and filter through paper.	
(3) Oil bergamot	3 ounces
Oil lemon	3 ounces
Oil orange peel	3 ounces
Oil lavender	3½ ounces
Oil cloves	½ ounce
Oil cinnamon	½ ounce
Oil neroli	½ ounce
Water	1 gallon
Alcohol	1 gallon
(4) Oil of lemon	4 fl. drams
Oil of bergamot	3 fl. drams
Oil of neroli	2 fl. drams
Oil of lavender flowers	1 fl. dram
Oil of white thyme	50 minims
Oil of mace	50 minims
Oil of cassia	50 minims
Oil of rosemary	12 drops
Oil of peppermint	8 drops
Pern balsam	160 grains
Essence of violet	10 fl. ounces
Alcohol	50 fl. ounces

Mix, set aside for 8 days, agitating occasionally, and filter.

Corn Salve.

(E. W. H.) We cannot give the formula for the proprietary article. One of the following may serve your wants:

(1) Salicylic acid	240 grains
Cerate	4 ounces
(2) Salicylic acid	10 parts
Balsam fir	5 parts
Resin	6 parts
Melt the resin, add the balsam of fir, and stir in the salicylic acid as it cools.	
(3) Yellow wax	6 ounces
Venice turpentine	¾ ounce
Pure resin	½ ounce
Salicylic acid	½ ounce
Balsam Peru	½ ounce
Vaseline	½ ounce
Melt over a slow fire or water bath. Stir until cool.	
(4) T. M. Griffiths' "Non-Secret Formulas" gives this one:	
Lard	2½ pounds
Beef suet	3¾ pounds
Wax	1¼ pounds
Salicylic acid	15 ounces

Syrup White Pine Compound and Yerba Santa.

(L. E. B.) Here is a formula of the character you name:

Fluid extract white pine bark	1 fl. ounce
Fluid extract yerba santa	1 fl. ounce
Fluid extract wild cherry	1 fl. ounce
Fluid extract blood root	56 minims
Fluid extract spikenard	54 minims
Fluid extract bark of Gilead	54 minims
Fluid extract sassafras bark	52 minims
Morphine sulphate	3 grains
Chloroform	54 minims
Purified talcum for magnesium carbonate	2 drams
Sugar	14 Troy ounces
Water, enough to make	16 fl. ounces

Mix the fluid extracts with about 6 ounces of water and the purified talcum, and stir or agitate the mixture promptly and thoroughly during about fifteen or twenty minutes. Transfer it to a wetted filter, and, when the liquid ceases to drop from the funnel, wash the contents of the filter with water until 8 ounces of filtrate have been obtained. In this dissolve the sugar and morphine sulphate by agitation, and add enough water, previously passed through the filter, to make, with the chloroform when added to the syrup, 16 fluid ounces. Lastly add the chloroform and shake thoroughly.

By a little modification the formula for compound syrup of white pine, N. F. (No. 386), may be made to answer your purpose.

Treatment for Tetter.

(H. A.) The treatment of stubborn cases of tetter should be under the direction of a physician. The disease is chronic in its nature, and often difficult to cure. Some persons have a marked predisposition to this affection. In general, the use of fatty, rich food tends to produce the disease in those so inclined. As a rule the diet should be strictly regulated, and all stimulating food avoided. If the general health is impaired it is customary to prescribe such remedies as tonics, iron, cod liver oil, arsenic, etc. Various soothing and protective lotions and ointments have been recommended. Conwell has found the following useful in chronic tetter:

(1) Tar	30 grains
Zinc oxide	50 grains
Cold cream	1 ounce

Apply two or three times a day.

(2) A soft jelly or ointment for local treatment is the following:

(2) Tricaneanth	2 drams
Lime water	1 ounce
Glycerine	1 ounce
Rose water	3 ounces

(3) Potter ("Materia Medica, Pharmacy and Therapeutics") recommends the following as a soothing and protective application:

Carbolic acid	5 to 15 drops
Powdered calamine	
Zinc oxide, of each	½ dram
Ointment rose water	1 ounce

THE PHARMACEUTICAL ERA

[WEEKLY]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, MARCH 10, 1898.

No. 10.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York.
By D. O. HAYNES & Co.

Subscription Rates:

U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL..... 349	Opinions on Phenacetine Case..... 371
Effects of Borax and Boric Acid on Nutrition..... 351	Explosion and Death..... 371
ERA COURSE IN PHARMACY..... 353	Druggists' Fire Tax..... 371
Inorganic Chemistry..... 353	Cheaper Telephones..... 372
Pharmaceutical Microscopy..... 356	John C. West Drug Co..... 372
Vanilla in Commerce..... 359	NEWS LETTERS..... 373
Varieties of Cardamom..... 360	ASSOCIATIONS..... 377
Authors and the Journals..... 360	State Pharmacy Bill introduced..... 378
PHARMACY..... 361	DRUGGISTS' ADVERTISING..... 379
QUESTION BOX..... 362	BUSINESS RECORD..... 380
NEWS AND TRADE DEPARTMENT..... 365	BOARDS OF PHARMACY..... 381
National Pure Food and Drug Congress..... 365	PATENTS, TRADEMARKS, ETC..... 381
F. K. Stearns Honored..... 369	OBITUARY..... 382
Shorter Hours Bill..... 369	STATE OF TRADE..... 383
Flurry in Quinine..... 370	MARKET REPORTS..... 384

"The British and Colonial Druggist," London.

Subscriptions and advertisements for this weekly drug journal will be received and forwarded through this office. Specimen copies and schedule rates will be furnished upon application.

ERA COST AND STOCK BOOK.

The Era Cost and Stock Book is a most serviceable adjunct to the usual set of drug store books. The ordinary books will show receipts and disbursements, bills payable and receivable, but with the addition of this Cost and Stock Book there is afforded means for determining the merchandise assets—a most convenient thing when an insurance company, commercial agency, or even tax assessor makes inquiries.

The book contains a complete list of drugs and chemicals (over 6,000 items) with prices, with room for as many more additions or for keeping record of sundry stock. It is specially ruled to provide for a record of cost and selling prices and can also be used to indicate location of goods in store and for inventories. It has 24 blank pages for keeping record of addresses and discounts, and it is thumb-indexed for quick reference. Price \$2.50 per copy postpaid.

A Patent Medicine Exchange.

A subscriber writes: "Don't you think a patent medicine exchange would be a great thing for your paper? I am sure the retailer would get in line if he found he could communicate with a purchaser for his old patents."

Theoretically this proposition is all right, but practically it doesn't work. We established such a department a few years ago and earnestly worked to arouse interest in it, but we did not get enough support from druggists to pay for the ink used. And really, more mature consideration of the question leads us to believe that circumstances are such as to entirely preclude the possibility of success for such a scheme. The best way to settle the matter seems to be to leave it to local associations, where such exist. Members of such organizations can trade between themselves, and by getting into correspondence with other similar organizations in other localities can dispose of slow sale patents where the demand is greater. Something can be done, too, with those advertisers in drug journals whose business is buying, selling and exchanging "unsalable" patents.

We would be glad to act upon our correspondent's suggestion did we see any probability for success, but former failure in this regard has bred discouragement.

Value and Supply of Mercury for Industrial Application.

Many trade journals and newspapers are calling attention to the fact that with the development of the new gold fields a change in the mercury market is bound to come, for mercury is indispensable in the process of separating the gold from the sand or quartz in which it is found. There was no immediate increase in the demand for mercury when the gold fields in Alaska were opened, probably because the mining here as yet has been on too small a scale to require a great amount of this metal, but the consumption in this country is greater now than in years gone by, and already exceeds the production. At one time this country was in competition with Europe for the trade of Japan and China, but this has ceased, as the supply can no longer stand the drain. The controlling quicksilver mines in California are made to yield about as much as they are able, yet the reserve is diminishing and is threatened with further depression by the revival of business and the increasing use of electrical appliances (in the production of which much mercury is employed), as well as by probable developments in gold mining.

Experienced quicksilver miners say that any further notable drain upon the supply will necessitate importation. This would open the market here to the Spanish mines, the richest in the Eastern hemisphere, which have been leased on percentage by the Rothschilds. The Rothschilds own also the Idria mines in Austria, which yield about one-third as much as the Spanish mines. The Rothschilds may therefore have to be depended upon largely for the mercury that gold mining may require in the future, and their price is likely to be the price the world over. Quicksilver used to cost one dollar a pound not very long ago, but during the last few years it has fluctuated between forty-three and sixty-five cents a pound. Only a few months ago the price went down to fifty-one cents. In richness the deposits of New Al-

maden in California almost eclipse the European mines, and the present deficiency in the reserve is due to the fact that the consumption is greater in this country than elsewhere. That the stock on hand is the smallest for fifteen years, although the mines have held pretty nearly the present production, shows that importation is sure to accompany the continuation of consumption at the present rate.

Mercury is used in various kinds of mining machinery to amalgamate with the gold dust; that is, to absorb the gold as the auriferous earth is swept over its surface. It is possible, of course, to wash the sand from the precious metal with water alone, but that is an old and slow process, as the earth has to be worked over and over again, and yet much of the gold dust is lost. In the mechanical preparation of auriferous gravel, worked out from the vein with forcible streams of water, the gold is removed from the waste substance by amalgamation with mercury. The quartz is ground to a fine powder with a mill, mercury being fed into the mill in a finely divided state together with the quartz. As the matter is discharged from the mill it is carried forward by flushing water over a table in front that is covered with copper plates full of mercury. As the stuff is distributed over the mercury the gold subsides in virtue of its greater weight, while the quartz and lighter material pass over and are carried off. The gold is thus brought in contact with quicksilver in various ways and separated from the waste matter, and when it has been separated from the amalgam, the mercury is used over again.

Advice.

Under this heading a New England jobbing drug house some time ago sent to its customers a few words relative to the methods pursued by certain concerns which are "working" the retail druggists. The jobbing firm now says: "Had the trade profited by our advice probably thousands of dollars would have been saved. We turned down in cold blood one day over \$700 worth of turn-over orders offered us by a concern whose methods we did not like. The plan presented was very slick and smooth, but to us was so transparent that we did not bite. We again advise our trade to consult with their jobber before giving cast iron contracts to strangers, particularly if they are approached by a gentleman (?) who would naturally have to stand on his head if he wished to turn up his nose."

It does not require much effort to guess toward what concern this advice and warning are directed.

Police Touts for Dispensaries.

A New York physician journeyed to Philadelphia recently and read to an audience of physicians a paper on the free dispensary evil. In the course of his remarks he noted that about 50 per cent. of the dwellers in New York obtain gratis treatment at the hospitals and dispensaries. The competition among the New York hospitals to secure patients is intense, he said, but in Philadelphia there were rumors to the effect that policemen were paid from \$1 to \$2 by the hospitals for each patient brought in. Now, Philadelphia doesn't like to have New Yorkers come over and criticise her, the more especially in such a manner as this, so it is not surprising that she finds many and ardent defenders of her fair fame. The Director of Public Safety has written a letter to the New York media, asking the sources of his information, and saying:

"I doubt the accuracy of these statements because they pre-suppose that policemen for money would willingly be a party to that which would in itself be cruel and unjust to the unfortunate sick or wounded. My experience with the force is that they are not inhuman, but, on the contrary, kind hearted. The rules of this department provide that a sick or wounded person must be taken to the nearest hospital, except where the patient ex-

presses a positive desire to be taken to another. Patients very rarely exercise this privilege.

"Without having accurate figures before me, I think I am right when I state that the Pennsylvania Hospital has more cases sent to it by the police force than any other hospital in Philadelphia, and I understand that it has not received an appropriation from the State for over one hundred years. Persons handled by the police force are never taken to the smaller hospitals."

We do not believe it of Philadelphia, either.

Stamp Tax for War Revenue.

In the event of war with Spain, which many believe is impending, a New York newspaper suggests that among other means to raise the necessary additional revenue the revival of the old stamp tax on proprietary medicines would be the proper thing. This would be a test of the patriotism of the manufacturers which they would undoubtedly submit to without protest. It would prove the sincerity of their repeatedly published asseverations that their mission on earth is the furthering of the welfare of humanity. Though possibly they did not anticipate doing it in just this way.

There is in Ohio just now great discussion and lavish use of expletives and obprobriary adjectives pro and con caused by the discovery that in the Appropriation bill introduced into the State Legislature the amount named for the use of the Dairy and Food Commission "for investigation and prosecution" had been cut from \$10,000 to \$2,500. No one seems to know or will admit who did it, and recriminations fill the air. Supporters of the Dairy Commission contend that this action will seriously cripple it, making it impossible to carry out the campaign designed, and materially hinder the execution of the Pure Food and Drug law as intended. This cut is publicly stated to be due to the exertions of a certain class of manufacturers of proprietary articles and adulterated foods and drugs who have good reason to fear prosecution by the Commission. How the matter will terminate is not known.

The use of slippery elm bark is far greater than generally supposed and its collection is a rather important industry. A single concern is said to use nearly 200,000 pounds annually. A well posted authority says that if the people would pay particular attention to gathering this bark for the market, it is so easily gathered, and requires so little work, it would be quite remunerative, especially as it can be gathered from the time the sap rises until the fall. It is not necessary to cut down or kill the trees. It is better to not cut them down nor kill them. If enough bark is left, the parts stripped will be covered thicker and better in time. All that is required is that the outside, or rough part of the bark, be taken off clean to the white part of the bark; then, that the bark be thoroughly dried, and while drying protected from the weather.

The hair of the dog to cure the bite finds recent exemplification in the invention of a new kind of paint for ships' bottoms. Its principal and protective constituent is seaweed. It is said to prevent shells and weeds from adhering to the vessel, and also to discourage worms from boring into any submerged wooden construction. Seaweed, green and wet, is ground in oil and then mixed in proper proportions with litharge, lead acetate, turpentine and linned oil previously well boiled together. If this paint proves effective, as claimed, it is the solution of a long standing and vexatious problem.

It has been suggested in Paducah, Ky., that the drugs for the city hospital in that city be purchased at wholesale, and that the city physician be required to dispense drugs instead of writing prescriptions. Thus is one more prop of the druggist knocked from under him.

The manufacturers of a certain cough troche have for years made an annual distribution of their preparation to the members of the Massachusetts Legislature. Presumably that the law-makers may talk more, easier and better. We commend this custom, and recommend its extension to other classes of articles. If each manufacturer of a proprietary medicine were to contribute thereof, and it really would do all claimed for it, think how our legislators would be purified and strengthened. Let us, by all means have an annual spring cleaning of this, or any other nature.

A Massachusetts drug store was raided by the police a few days ago and six and a half gallons of whisky and twelve cases of beer were seized. It might be easy to explain the presence of the whisky as a portion of the legitimate stock, but twelve cases of beer—that's another story. It would take a sudden epidemic of some strange disease to require this amount of beer at one time for medical purposes. It is an article which doesn't keep well, and must be disposed of promptly to avoid loss. The inference is certainly against the druggist.

The proceedings of the American Pharmaceutical Association at its meeting at Lake Minnetonka, have just been distributed to members. The volume is of the type customary, contains 849 pages, and is principally, if not solely, valuable for the report on the Progress of Pharmacy, covering, this year, 423 pages. The detailed report of the proceedings, even the papers read before the several sections, are of little service or interest, save as a matter of record. The pharmaceutical journals gave all this matter when it was fresh, nine months ago.

The Kansas druggist, for signing whose petition for a permit to sell liquor ex-Governor St. John was roundly denounced by the W. C. T. U., has been denied this permission by the court. The newspaper comments are confined to the bald statement that "the decision was heartily cheered by a big crowd." We do not believe, however, that this vociferous approval voiced the sentiments of all the population of the town, or of Kansas citizens generally.

There has just been presented to the Ohio Legislature the Pharmacy bill which was given in extenso in this journal January 27. In general it is a strengthening of the existing law, and is along the lines common to such enactments of recent years. A rather unusual feature is the provision making it a misdemeanor to give a wrong name when applying for examination and registration. There have been some instances of this sort in Ohio, and it is proposed to thus guard against them.

A Cleveland druggist has been indicted for unlawfully practicing medicine. An emergency call was sent to the drug store for a physician. The druggist responded, it is alleged, saying he was a doctor, and gave the patient medicine. If these are statements of facts, and it be shown that the druggist is not a legally qualified physician, it seems to be a strong case against him.

A rather unique phase of the druggist-liquor-selling question has come to light in a Missouri town, where the Odd Fellows are hot after the drug stores for selling liquor contrary to law to one of the members of their lodge, who imbibed too freely for his own good and greatly to the discredit of the order.

ASAPROL is employed of late in whooping cough in form of a 1 per cent. solution. The liquid is applied to the throat with a small brush. (Ap. Ztg.).

THE EFFECTS OF BORAX AND BORIC ACID ON NUTRITION.*

BY R. H. CHITTENDEN, PH. D.,

Professor of Physiological Chemistry in Yale University.

In a recent report of the Connecticut Agricultural Experiment Station it is stated that borax and boric acid are now extensively used as food preservatives, since they are effective and cheap, as well as odorless, and their taste is easily lost or disguised when they are mixed with food. In view of these facts the question at once arises as to the possible effects of the continued or frequent use of these preservatives upon the health of consumers. To what extent do these substances exert an influence upon the processes of nutrition? This is obviously a question of considerable importance to the guardians of the public health, as well as to the consumers of such articles, and as a long series of experiments upon this subject has been recently carried out in the writer's laboratory, it may not be amiss to call attention to the general character of the results obtained.

As stated by Professor Johnson in the report above referred to, "whether any one antiseptic shall operate as a harmless preservative, preventive, or remedy, or as an unhealthful or even fatal poison to the consumer of food or drink containing it, depends upon the quantity and frequency of the dose." Of the general truth of this statement many illustrations are cited. Thus, acetic acid, the active constituent of vinegar, widely used as a preservative of pickled fruits, and many of the organic acids common to fresh fruits, are in small quantities and suitably diluted with water valuable additions to our food, but when largely used or taken in concentrated form may be quite injurious. So, too, with common salt. In small quantities it is constantly present in almost all natural food stuffs, and is even essential for life, but in large doses it becomes not only disagreeable but dangerous. Hence, in considering the possible physiological action of such an agent as borax, or any other so-called food preservative, we must give due weight to the relative proportion of the active substance ordinarily present in the food. No doubt this is subject to wide variation, but we may draw some conclusions from the results of quantitative analysis of food products containing preservatives. Quoting again from the report above referred to, we find that of forty-two samples of sausages examined last year at the Connecticut Experiment Station, twenty-seven were found to contain borax. In five of these samples the proportion by weight of borax was 0.12, 0.27, 0.30, 0.51, and 0.72 per cent. respectively. Borax was likewise found in opened oysters, the proportion present in four samples examined being 0.44, 0.57, 0.67, and 0.11 per cent. respectively. In one sample of head cheese 0.176 per cent. of borax was found. Salt codfish was likewise found to contain borax, but no quantitative determinations are reported. From these figures we may gain some knowledge as to the proportion of borax that may be present in foods preserved by this substance. Obviously, it would be rare indeed for a daily ration of food and drink to contain 0.5 per cent. of borax.

In our experiments upon dogs, the animals were first brought into a condition of nitrogenous equilibrium, in which the nitrogen of the ingesta practically equaled the nitrogen of the egesta—i. e., the output through the urine and feces. The diet was a mixed one, containing meat, fat (lard), and carbohydrate (cracker dust), thus affording conditions for the detection of any influence upon the digestibility of the three classes of food stuffs which borax might exert. The first experiment extended through twenty-seven days, being divided into three periods of nine days each—a fore period, a borax period, and an after period. The dog weighed twelve

*Reprinted from N. Y. Med. Jour.

kilogrammes, and the daily food, containing 9.814 grammes of nitrogen, was composed of two hundred and fifty grammes of fresh lean beef, forty grammes of lard, seventy grammes of cracker dust, and five hundred cubic centimetres of water. During the borax period, five grammes of borax were administered with the food each day, making a total of forty-five grammes of borax for the nine days' period. This quantity of borax was equal to 1.3 per cent of the solid food, and to 0.6 per cent. of the total food and drink. The nitrogen of the urine and faeces was determined each day, also the volume of the urine, its specific gravity, total sulphur and phosphorus, uric acid, total and combined sulphuric acid, etc. The fatty, or ether-soluble, matter of the faeces was likewise determined.

A similar experiment with boric acid, extending through thirty days, was also tried. In this experiment boric acid was given with the food for ten days, one to two grammes per day, the total amount administered being 14.5 grammes. With two grammes of the acid per day the mixture of food and drink contained 0.31 per cent. of boric acid, while the dry food contained 0.86 per cent. of the acid.

Lastly, a third experiment was tried, extending through fifty-six consecutive days, during which the variations in the composition of the urine and faeces were followed as before, under the influence of both borax and boric acid. A bitch of ten kilogrammes' body weight was brought into nitrogenous equilibrium, and after a fore period of eight days was fed with borax for eight days, the total amount of borax fed being 32.5 grammes. This was followed by a period of eight days without borax, after which boric acid was administered for a like period, seventeen grammes in all. Then came another period of eight days without the preservative, after which borax was fed for eight days in large doses—i. e., eight to ten grammes daily. Finally came an after period of eight days.

By this kind of experimentation, with constant daily analyses of the urine and faeces, with animals originally in a condition of nitrogenous equilibrium and under a diet of known composition, we have followed out carefully the changes which the above doses of borax and boric acid seemingly called forth.

The results obtained clearly indicate that moderate amounts of borax exert no measurable influence upon the metabolism of proteid matter. With dogs weighing ten to twelve kilogrammes a dosage of two to five grammes of borax per day, mixed with their food, is apparently without effect upon those nutritional processes which have to do with the utilization of the proteid food stuffs. The body remains in essentially the same condition of nitrogenous equilibrium as when the food is free from borax. Further, chemical analysis of the excrement shows that with such doses of borax there is no distinct increase in the amount of faecal nitrogen, thus indicating that the substance does not exert any inhibiting influence upon the digestion or assimilation of the proteid or albuminous foods. Neither, judging from the amount of ether-soluble matter in the faeces, is there any distinct influence upon the assimilation of fat exerted by small doses of borax. Body weight remains practically constant, and there is no evidence of any specific influence upon the general nutritional changes of the body. The only results of any significance which we have found with the above amounts of borax is a tendency for the urine to become alkaline, owing to the rapid elimination of the salt through this channel, and a slight diminution in the volume of the urine during the borax periods.

With larger doses of borax, however, positive evidences of physiological disturbance are found. Thus, with dogs of the above weight (ten kilogrammes) daily doses of eight grammes of borax, equal to 1.21 per cent. of the daily food and drink, or nearly 3.5 per cent. of the

food alone, have a distinct stimulating effect upon proteid metabolism, increasing the output of nitrogenous matter through the urine. Coupled with this effect is a pronounced tendency to diminish the assimilation of both proteid and fatty foods, increasing the weight of the faeces and their content of both nitrogen and fat or ether-soluble matter. Further, with very large doses of borax there is a tendency toward diarrhoea and an increased excretion of mucus in the intestinal tract. The presence of 1.5 to 2.0 per cent. of borax in the daily food is very liable to produce nausea and vomiting. Under no conditions, so far as we have been able to observe, does borax produce diuresis. Neither does it tend to increase body weight or protect the proteid matter of the tissues.

Boric acid in doses up to three grammes a day is, so far as we can judge from our experiments, without influence either upon proteid metabolism or upon the general nutritional processes of the body. It likewise has a less disturbing effect than borax upon the assimilation of proteid and fatty matter in the gastro-intestinal tract, the doses of acid mentioned above leading to no increase whatever of either nitrogen or fat in the faeces. Like borax, however, increase of the dosage to 1.5 to 2.0 per cent. of the daily food is liable to produce nausea and vomiting. Unlike borax, boric acid is apparently without effect upon the volume of the urine, showing no tendency, in the doses used, to alter the volume of the secretion. Further, as would be expected, the reaction of the urine remains acid.

Both borax and boric acid are without influence upon the putrefactive processes of the intestine, apparently because of their rapid absorption from the intestinal tract and quick elimination through the urine. Practically, elimination is complete twenty-four to thirty-six hours after the last dose of borax or boric acid has been given. Obviously, this rapid elimination precludes the possibility of any marked cumulative action from the daily ingestion of moderate quantities.

So far as its influence upon proteid metabolism is concerned, it is very evident that when borax is given in sufficient quantity to produce any effect its action is similar to that of common salt—i. e., like sodium chloride, it tends to increase proteid decomposition. This conclusion is in harmony with the results of Gruber and the statements of C. Voit. Gruber, moreover, asserts that borax, like sodium chloride, tends also to increase the excretion of water through the kidneys. Any evidence of such action, however, we have been unable to find. On the contrary, all of our results show a slight decrease in the volume of the urine under the influence of borax.

COMBINATIONS OF STARCH AND ALLIED SUBSTANCES WITH ACETALDEHYDE AND PARALDEHYDE.—The manner of preparation is the same as for the corresponding formaldehyde compounds. Starch or bodies related to it (dextrins, gums, pectins), or the algae, etc., containing them, are heated with acetaldehyde or paraldehyde at elevated temperatures under pressure and the products of the reaction freed from excess of aldehyde by means of alcohol. The preparations resemble in physical properties the corresponding compounds of formaldehyde, and have been found of value in wound treatment. (Chem. Ztg., through Ap. Ztg.).

IMPERVIOUS GELATINE PAPER.—Paper is painted on both sides with a solution of 1 part of gelatine in a mixture of 4 parts of water and 1 part of glycerine. After drying, it is immersed in a solution of 750 Cc. of commercial formaldehyde in 5 liters of water. When dry, the coating of gelatine is so changed that even steam is without influence on it. (La Med. Mod., through Ap. Ztg.).

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Ellas H. Bartley, B.S., M.D., Ph.D.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblenz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Phar.D.
Wilbur G. Compber, A. M., M. D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heehner, Phm.B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M.D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in **THE PHARMACEUTICAL ERA**, and the **QUIZZES** and **EXAMINATIONS** are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and **DIPLOMAS** are issued to all passing final examinations. Each year is divided into two terms. The first term of the junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the **ERA**, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 51.

Inorganic Chemistry.

The Boron Family (Continued).

THE ALKALI METALS.

Symbol.	Valence.	Atomic weight.	Specific gravity.
Gallium, Ga.	2 and 3.	69.	5.9
Indium, In.	2 and 3.	113.7	7.4
Thallium ¹ Tl.	1, 3, and 4.	204.18	11.9

These three elements are of comparatively rare occurrence in nature, and are of scientific interest only.

Historical.—All three elements were discovered by the aid of the spectroscope. Gallium was discovered by Lecoq de Boisbaudran in 1875, and named by him in honor of France, the Latin name for which is Gallia. It is noteworthy that the existence of an element with the properties of gallium had been predicted several years before by Mendelëeff, on the ground of certain data furnished by the "periodic classification" of the elements.

Indium was discovered in 1863 by Reich and Richter and named by them from Indicum, the Latin name for indigo, in allusion to the blue color of its spectrum.

Thallium was discovered by Crookes in 1861, and was given its name because of the green color of its spectrum, from the Greek Thallos, a green twig or branch.

Natural Occurrence.—The three elements are alike in being of extremely rare occurrence, and in being found in certain varieties of zinc blende, a natural sulfid of zinc, and sometimes also in iron and copper pyrites.

Preparation.—The metals of this group may be obtained in the free state by the electrolysis of alkaline solutions of their salts or by the reduction of their oxids by heating them in a current of hydrogen.

Description and Physical Properties.—These elements are white, or bluish-white metals, with brilliant lusters. Gallium is hard and crystalline, neither malleable nor ductile. It melts at 30° C., and has a specific gravity of 5.9. Indium is both malleable and ductile, and softer than lead. Its melting point is 176° C., and its specific gravity 7.4. Thallium is crystalline, like tin, malleable and ductile, melts at 290° C., and has a specific gravity of 11.9.

Chemical Properties.—Gallium is but slightly attacked by oxygen, even when heated. It is dissolved by hydrochloric acid, and by solutions of the alkalis, releasing hydrogen. Indium does not oxidize at ordinary temperatures, but when heated to a sufficiently high temperature burns with a beautiful blue flame. It does not decompose water either cold or hot. Thallium oxidizes readily in the air, and when burned imparts a green color to the flame. It is dissolved by nitric and sulfuric acids.

COMPOUNDS.

Oxygen Compounds.—Gallium and Indium each form a monoxid, GaO, and InO, and a sesquioxid, Ga₂O₃, and In₂O₃.

Corresponding to the sesquioxids are the hydroxids, Ga(OH)₃ and In(OH)₃, formed by precipitating gallium or indium salts with ammonia water. The sesquioxids and their hydroxids are both basic and acidic, the latter character, however, being only slightly pronounced.

Thallium forms a monoxid, Tl₂O, a sesquioxid, Tl₂O₃, and a dioxid or peroxid, TlO₂. The monoxid is remarkable for its ready solubility in water to form thallous hydroxid, TlOH, having strongly alkaline properties. When precipitated by alkaline hydroxids thallie salts yield a hydroxid, Tl(OH)₃, which on drying loses water and becomes TlO₂H. The peroxid, TlO₂, is said to possess acid properties.

Halogen Compounds.—Gallium and indium each form a dichlorid, GaCl₂, InCl₂, and thallium a monochlorid, TlCl. All three form trichlorids, GaCl₃, InCl₃, and TlCl₃. In general, the trichlorids are somewhat instable, and on heating their solutions yield basic salts. Thallous chlorid, TlCl, is insoluble in water. It resembles silver chlorid in appearance, and turns violet on exposure to the light.

Other compounds, as double sulfates, or Alums, and sulfids, are also known, but are not of sufficient importance to merit the student's attention.

THE ALKALI METALS.

Lithium. Sodium. Potassium. Rubidium. Caesium. (Ammonium).

The alkalis form a group of well-marked characteristics. In the free state they decompose water, uniting with its oxygen and setting free the hydrogen. Their compounds are colorless, unless they contain some other element which yields colored compounds. Nearly all their salts are freely soluble in water.

LITHIUM.

Symbol Li. Valence 1. Atomic Weight 7. Specific Gravity 0.539 to 0.538.

Historical.—Lithium was discovered by Aug. Arfvedson in 1855, in the laboratory of the chemist Berzelius. The free element was first prepared by Bunsen and Matthiessen in 1855, by the electrolysis of its chlorid, i. e., by decomposing the latter salt by means of the electric current. Berzelius gave it the name lithium, from Lithos, stone, as it was then believed to be derived from the mineral kingdom only, in contradistinction to the other alkalis which are found in both organic and inorganic matter.

Natural Occurrence.—Lithium is very widely distributed in nature, but occurs in small quantities only. It is found in various minerals, as triphylite, spodumene, lepidolite, etc., in mineral waters, in the sea, and in almost all surface waters. It is also found in many soils, in the ashes of plants and in animal tissues. Generally it is present in such small amount that it can be detected only by means of the spectroscope.

Preparation.—The element is obtained in the free state by electrolyzing the fused chlorid, the fused metal being removed before it has time to oxidize, and preserved under naphtha.

Description and Physical Properties.—Lithium is a silver white metal, with a brilliant luster, tarnishing in the air, but not so quickly as sodium or potassium. It is harder than the last named metals, but softer than lead. It is the lightest known metal, and floats on petroleum, its specific gravity being 0.539 to 0.538. It melts at 180°. At ordinary temperatures it is soft enough to be welded or drawn into wire.

Chemical Properties.—Heated in the air it burns with a brilliant flame, forming lithium oxid, Li_2O . It decomposes water with less violence than the other metals of the group and without melting. On account of its affinity for oxygen, and its low specific gravity, it can be preserved only under the lightest varieties of naphtha.

COMPOUNDS.

It forms a series of salts corresponding to those of sodium and potassium, but the principal compounds are the oxid, the hydroxid formed by dissolving the oxid in water, the chlorid, and the carbonate. The carbonate and some other salts have been used in medicine, in gouty affections, because of their alleged property of combining with uric acid to form soluble urates.

Characteristic Reactions.—Lithium is best detected by the color which it imparts to the non-luminous flame, and by the spectroscope. Through the latter instrument it is seen to give a weak yellow, and a strong red line. The reaction is said to be sufficiently delicate to detect the 9-10,000,000 of a milligram.

When first held in the flame a lithium salt gives a flash of rich crimson, followed by a deeper red, slowly changing to purple. The color is obscured by the presence of sodium and potassium, though the color of the sodium flame can be excluded by a moderately thick blue glass.

SODIUM.

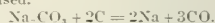
Symbol Na. Valence 1. Atomic Weight, 23. Specific Gravity 0.97.

Historical.—Certain compounds of sodium, as the chlorid, carbonate, etc., have been known since prehistoric times. Anciently the term Nitrum was applied to the carbonate, used both as a detergent and in glass manufacture. At

a later date the term was transferred to saltpeter, or nitre. The term Natron, from which the symbol is derived, came into use in the 15th century. Metallic sodium was first obtained in 1807 by Sir Humphrey Davy, by the electrolysis of the hydroxid.

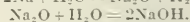
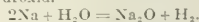
Natural Occurrence.—Sodium compounds are widely and abundantly distributed over the earth. The most abundant is the chlorid, or common salt, NaCl , the principal solid constituent of sea water, salt lakes and brine springs. It is also found in the solid state as rock salt, probably deposited by the drying up of portions of the sea. The carbonate is also found in great quantities in alkaline lakes and springs and in the earth of alkali deserts. Immense deposits of the nitrate are found in the rainless districts of Chili and Peru.

Preparation.—The metal is prepared by heating together in iron retorts a mixture of the carbonate and charcoal. Carbon monoxid is formed and the metal distills over and is condensed.



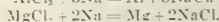
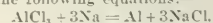
Description and Physical Properties.—At ordinary temperatures sodium is a soft white metal, as easily cut as wax, and showing on a freshly cut surface a brilliant silver-like luster, rapidly tarnishing in moist air. At 95.6° C. it melts to a liquid which looks like mercury. It is a better conductor of heat and electricity than any of the metals except silver, copper and gold.

Chemical Properties.—It oxidizes in moist air with such rapidity that it must be kept under naphtha or some liquid which does not contain oxygen. When thrown upon water it decomposes the latter with more violence than lithium, first forming the oxid, which then dissolves to form the hydroxid.



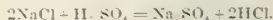
The heat of the reaction causes the metal to fuse and if the water be warm, or if the metal be prevented from moving about, may ignite the hydrogen, the flame being colored bright yellow by the burning sodium.

The principal use of the metal is in the reduction of certain other metals, as aluminum and magnesium, when heated with their chlorids, by its great affinity for the negative element with which they are combined, as exemplified by the following equations:—



COMPOUNDS.

The principal compounds are the chlorid, carbonate, sulfate, borate, and nitrate. Large quantities of the carbonate are used in glass and soap making and in the alkali industry. For the manufacture of the carbonate the chlorid is always used as the starting point, the oldest and most celebrated method being known, from its inventor, as the Le Blanc Process. The first step of this process is the conversion of the chlorid to the sulfate.

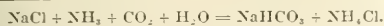


The sodium sulfate is then heated with a mixture of powdered coal and chalk or calcium carbonate, calcium sulfid and sodium carbonate being produced. It is probable that the sodium sulfate is first reduced to sulfid by the reducing action of the carbon and then reacts with the calcium carbonate to produce calcium sulfid and sodium carbonate.

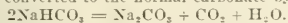


The mass is then lixiviated, i. e., treated with water, by which means the sodium carbonate is dissolved out, and may be purified by recrystallization.

A more modern and extensively used method of making sodium carbonate from the chlorid is known as the Solvay or ammonio-soda process. This consists in saturating a strong brine of sodium chlorid with ammonia and carbon dioxide gases, when the following reaction takes place:

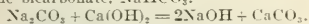


The bicarbonate, which is comparatively insoluble, precipitates, when the supernatant liquid is decanted, the bicarbonate washed with a small amount of water, dried, and finally converted to the normal carbonate by heat.



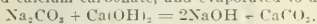
The preceding equations only represent the final result. The real reactions are doubtless much more complicated.

When the carbonate is treated with carbon dioxide in the presence of moisture it takes up more of the gas and forms the bicarbonate, NaHCO_3 .



This compound is commonly known as "baking soda," and is used in the manufacture of baking powders, on account of the large amount of carbon dioxide it yields when decomposed by an acid substance.

Sodium Hydroxide is prepared from the carbonate by treatment with milk of lime, whereby the hydroxide is produced in solution and may be poured off from the precipitated calcium carbonate, and evaporated to dryness.



Sodium hydroxide when pure is used as a laboratory reagent. The cheap commercial article is commonly known as "concentrated lye."

Sodium Sulfate, as previously described under sodium carbonate, is known as Glauber's Salt, and is used in veterinary practice as a purgative.

The remaining sodium compounds, as the chlorate, nitrate, borate, iodide, bromide, etc., are mainly important because of the properties of their radicals, and are best considered in connection with the negative elements which they contain.

Sodium compounds are found in the ashes of all plants, the ash of sea weeds being especially rich in them. They are also found in the tissues of all animals, the carbonate, phosphate, and chloride being the most abundant.

Characteristic Reactions—The sodium compounds are recognized by the yellow color which they impart to the non-luminous flame, and by the spectroscopic. The sodium spectrum consists of two bright yellow lines so close together that with an inferior spectroscope they may appear as one. The spectroscopic test is so delicate that it will show the presence of 1-3,000,000 of a milligram. The air of laboratories usually contains sufficient dust of sodium compounds to color the flame distinctly yellow.

PRACTICAL STUDIES.

1. Bend a small loop or ring on the end of a platinum wire, the other end of which is fastened in the end of a small glass tube to serve as a holder. Dip the loop into hydrochloric acid and hold it in the edge of the non-luminous flame of a Bunsen or alcohol lamp until the wire ceases to impart any color to the flame.

2. After the wire has been thoroughly cleaned in this manner, dip it into a solution of lithium chloride, or a solution of any other lithium salt acidulated with hydrochloric acid, and again hold in the flame. Note carefully the color imparted to the flame, both at the moment of introducing the wire, and as the color slowly disappears. Repeat the experiment until you are sure that you will remember the character of the lithium flame.

3. Clean the wire again and dip the loop in a solution of sodium chloride, or of any sodium salt after acidulation with hydrochloric acid. Hold in the edge of the flame as before.

4. Repeat the last experiment and hold the back of the hand in the light produced. Notice its bloodless or corpse-like appearance.

5. Repeat the last experiment and observe the flame through a crystal of potassium dichromate. Note that the crystal seems almost or quite colorless.

6. Again repeat the experiment, and observe the flame through a blue or cobalt glass held close to the eye. Observe the fact that the yellow color of the sodium flame does not penetrate the blue glass.

7. Wipe a piece of metallic sodium, the size of a small pea, free from petroleum, and drop on some water contained in an evaporating dish, holding close above the dish a piece of glass to protect the face and clothes from flying bits of the metal. Note what occurs. Does the metal melt?

8. Pour out the water from the dish and line the latter with well wetted blotting paper. Drop another piece of sodium on the wetted paper, and protect the face with a piece of glass as before. The paper prevents the metal from moving about rapidly. What occurs now?

Note.—If a platinum wire is not at hand, a clean iron or aluminum wire or a thread of asbestos may be used instead. A brass or copper wire cannot be used, as it imparts its own color to the flame.

The chlorides are most volatile, and hence give the best flame colors. If a chloride is not used, some hydrochloric acid may be added to the solution.

ARTIFICIAL INDIGO.—O. N. Witt (Chem. Ind. Jour. Soc. Chem. Ind.) states that under the name of "Indigo, pure," synthetically prepared indigotine has recently been sent into commerce by the Bad. Anilin und Soda Fab. It appears in the form both of powder and paste, and, compared with the natural product, offers the following advantages: First, owing to an extremely fine state of division, the author states that it enables the tedious and expensive operation of grinding, necessary in the preparation of indigo for use, to be dispensed with. Secondly, as the product is pure, with its use a more effective control of the vats can be maintained than was formerly possible; moreover, the amount of indigotine consumed from time to time may be determined with exactitude. Thirdly, it is easily tested and valued. The product is already offered in commerce at about the same pro rata price as good qualities of ordinary indigo. It is therefore cheaper than the refined indigos of commerce, which are sold at a higher rate than ordinary indigos. It is found in practice that, whilst the new product, in dyeing, behaves towards wool similarly to natural indigo, it does not dye cotton so well as the latter does. This is owing to the presence in indigo of im-

purities which act as mordants for the vegetable fiber. In connection with this discovery, the further discovery is made that certain compounds—notably albuminoids, especially glue and fatty matters, among which Turkey red oil may be particularly mentioned—act even more powerfully in this capacity than the substances contained in indigo. These compounds may be added to the dye vats, but it is more practicable to impregnate the fiber with them before dyeing, as is the usual practice when dyeing with mordants. The cotton thus prepared not only dyes in a satisfactory manner, but also exhibits, when dyed, a fine purple shade, which contrasts greatly with the shade ordinarily obtained, and especially with the weak, greenish shade obtained from the artificial product in the absence of such mordanting compounds. The synthetic product is also advantageously employed in calico printing, and in the manufacture of indigo extract and carmine. For the latter purpose it is pointed out that the manufacturers of the new product have for some time past employed refined natural indigo, which answers better than the crude dyestuff. The results obtained, however, with the synthetic product are so much better that the firm has decided to use it exclusively.

LECTURE NO. 52.

Pharmaceutical Microscopy.

Mechanical Construction of the Microscope.

TEXT BOOKS ON MICROSCOPY.

The ensuing lectures on microscopy are of necessity brief and confined to a consideration of elementary principles. For those who have the inclination to pursue the subject further, the following texts are recommended: *Gage*, Microscopical Methods, Comstock Publishing Co., Ithaca, N. Y., Price, \$1.50. *Clark*, Practical Methods in Microscopy, D. C. Heath & Co., Boston, Mass., Price, \$1.60. *Base*, Elements of Vegetable Microscopy, published by the author, Baltimore, Md. Price, \$1.00. *James*, Elementary Microscopical Technology, National Druggist, St. Louis, Mo. Price, 75 cents.

The Simple Microscope.—A simple microscope is one which gives a virtual, erect and magnified image of an object when placed at the proper distance from the latter.

In its plainest form the simple microscope consists of a single biconvex lens mounted in a convenient holder of hard rubber or metal, as the common pocket magnifier (Fig. 12).

Sometimes there may be two or three such lenses (Fig. 13) so adjusted that they may be used singly or combined, but whether used singly or combined, the image is always virtual and erect, or not inverted, as in the compound microscope.

A convenient form is that of the tripod magnifier (Fig. 14), consisting of a biconvex lens held by a brass rim which screws up and down in a frame supported by a tripod. The advantage of this form is that it need not be held in the hand while using, and also that the movable frame in which it is fastened permits a moderate alteration of focus to suit the circumstances.

In the better class of magnifiers the lenses are corrected for chromatic aberration, as in the achromatic triplet of the illustration (Fig. 15). In this case a thick biconvex lens of crown glass lies between and is corrected

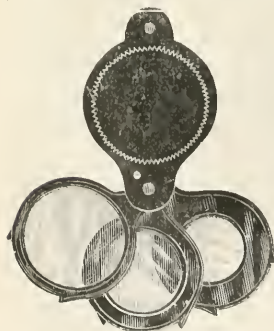


Fig. 13.—Triple Lens Magnifier.

by two concave lenses of flint glass at either end. The Coddington lens (Fig. 16) is a powerful magnifier of somewhat different construction.

The simple microscope is very valuable for the close

examination of small objects where high powers are not required. Sometimes it has a mechanical mounting so

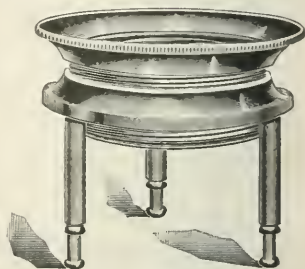


Fig. 14.—Tripod Magnifier.

that it can be raised or lowered above a stage which holds the object to be examined, and has a mirror for illumination placed below. When mounted in this manner the combination is known as the dissecting micro-

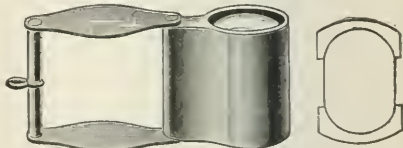


Fig. 15.—Triplet Magnifier.

scope, because used principally in the dissection of the tissues of plants and animals.

The Compound Microscope.—When the image produced by one lens or combination of lenses, instead of being viewed directly, is again magnified by another lens or combination, the entire arrangement constitutes a Compound Microscope.

For greater convenience of study it is common to divide the compound microscope into the Optical Parts, or



Fig. 16.—Coddington Lens.

the parts intended for the production of the image and its transmission to the eye, and the Mechanical Parts or Stand, which includes the entire mechanism employed in adjusting the optical parts with respect to each other and to the object to be viewed.

The Stand.—The Stand (Fig. 18) generally consists of the following parts: The Foot or Base, usually of a triangular or horseshoe shape, and purposely made heavy, as by loading it with lead, to give sufficient steadiness. The Pillar is the upright or standard, and

usually has a hinge joint to permit of the inclination of the instrument. The Arm O is the metal piece by means of which the pillar is connected with the Body C. The latter is the large hollow tube which has within it the Draw Tube D, by means of which the body may be elongated. At the lower end of the body is the Nose Piece E, a ring which is milled on the outside and has a screw

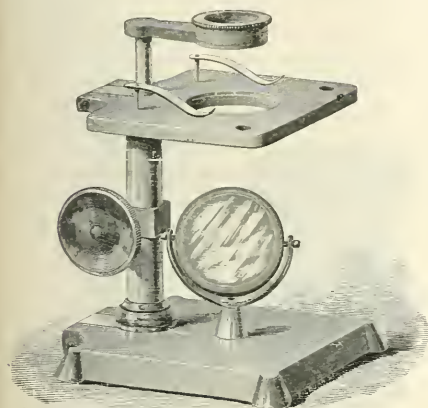


Fig. 17.—Dissecting Microscope.

thread inside by means of which the objective is attached to the body. The Stage F is the shelf attached to the pillar above the joint, and used to support the object subjected to examination. It may be either round or square, and has a round hole in the center known as the Well Hole or Stage Aperture, for the admission of light to the underside of the object. The stage is also provided with two flexible springs, used to hold the slip of glass upon which the object is placed, known as Clips. Usually the stage has an attachment beneath known as a Diaphragm, G, used to regulate the amount of light admitted through the well hole in the stage. A common form of diaphragm is a metal plate having perforations of different diameters and attached so that it can be turned to bring any desired size of aperture under the center of the well hole.

Beneath the stage is a movable bar, the Mirror Bar, K, having at its lower extremity the Mirror H, employed to direct a beam of light through the central opening of the stage. At the upper side of the arm is a rack and pinion arrangement turned by two projecting milled heads, known as the Coarse Adjustment, M, and used to rapidly elevate or lower the body and draw tube. Directly at the top of the arm is seen another milled head, standing vertically. This is attached to a fine screw termed the Fine Adjustment, N, the purpose of which is to raise or lower the body and its attachments slowly and through very small distances.

Very frequently other parts are used in connection with the stand, but these are best treated under the head of accessories.

Requirements of a Good Microscope Stand.—The stand as a whole should be of good size, with sufficient weight in the base to prevent its being easily overturned, and sufficiently rigid to do away with vibration. The importance of the latter requirement is apparent when we reflect that, supposing the optical parts magnify one hundred diameters, a side movement or vibration of the stage of one actual millimeter would show an apparent motion in the microscope of one hundred millimeters. The pillar should possess a joint to permit inclination of the body and stage. The stage

should be of ample size, so as to permit the manipulation of large slides, and its upper surface is preferably covered with hard rubber or glass to prevent corrosion by the reagents frequently made use of in microscopy.

The stand should be provided with both coarse and fine adjustment. The coarse adjustment should work smoothly, without grinding of the parts, or jerky motion. The fine adjustment should work evenly and regularly, and possess a considerable range of motion. The adjustment, and indeed, all movable parts of the instrument, should be provided with the means of taking up the "play" or lost motion which results from constant wear.

The mirror should be of ample size, with one plane and one concave side, and its attachment should be such that it may readily be brought above the surface of the stage for the illumination of opaque objects.

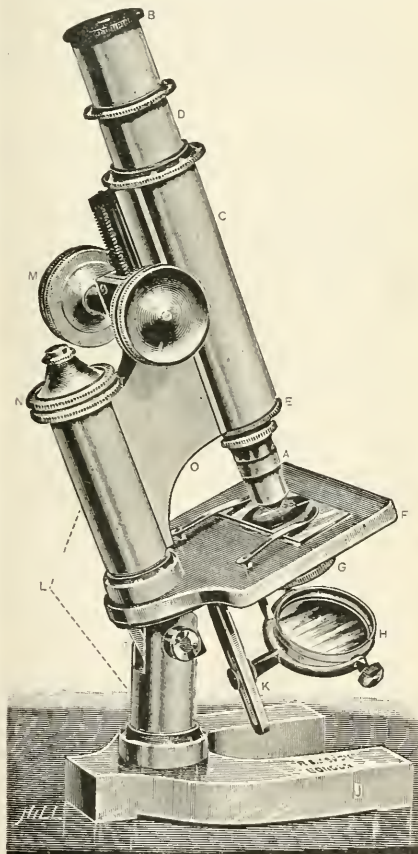


Fig. 18.—Compound Microscope.

The body should be lined inside with cloth to prevent scratching the surface of the draw tube when this is extended. The latter should be graduated in millimeters, so that the combined length of the body and draw tube, or the "tube length," as it is called, can be determined by simple inspection. The nose piece should be provided with the "society screw," in order to adapt it to the use of modern objectives.

THE OPTICAL PARTS OF THE MICROSCOPE.

These include all parts of the microscope employed in the formation of the image and its transmission to the eye, and would therefore also embrace the mirror, but as the latter is invariably attached permanently to the stand, it is generally considered a part of it. The other two essential optical parts of the compound microscope are the Objective and the Ocular or Eye Piece.

The Objective.—The objective A (Fig. 18) is the combination of lenses screwed to the nose piece at the lower end of the body, and its use is to collect the rays of light from the object under examination and by means of these to form an enlarged, real and inverted image at the upper end of the microscope body. It derives its name from the circumstance of its being placed next the object. Every objective in the modern instrument is made up of two, three, or even more, Systems or Combinations of lenses. (As previously described, each compound lens, consisting of a concave and convex lens is known as a system or combination.) The combination and the uppermost one as the Back Combination next to the object is spoken of as the Front Combination.

The objective is really the most important single portion of the microscope, and the one upon which the greatest care and pains are bestowed. Upon the perfection of the materials and workmanship employed in its manufacture depend the degree of freedom from chromatic and spherical aberration and the correctness of the images produced by it. When corrected for spherical aberration the objective is Aplanatic. When its chromatic aberration is corrected for two colors it is Achromatic, and when corrected for three colors, Apochromatic.

Designation of Objectives.—Two methods of designating objectives, according to their magnifying power, are employed. An old continental method is by letters of the alphabet, as A, B, C, D, etc., each letter in advance indicating a higher power than the one preceding it. This method is altogether arbitrary, and has been nearly entirely superseded by the plan of giving equivalent focal lengths expressed in inches or millimeters. According to this plan a one-inch objective is one whose magnifying power is equivalent to that of a simple lens of one-inch focus, a one-sixth-inch objective, the equivalent of a simple lens of one-sixth-inch focus, etc. As the sizes of the image and object vary as their respective distances from the lens, it follows that the shorter the equivalent focus the higher the magnifying power of the lens or objective, a half-inch objective giving a greater amplification than a one-inch objective, and a fourth-inch lens greater than the half-inch, and so on.

By remembering that the inch is approximately equal to 24 millimeters it is easy to translate fractions of the inch into their metric equivalents, e. g., $\frac{1}{2}$ in. = 12 mm., $\frac{3}{4}$ in. = 18 mm., $\frac{1}{8}$ in. = 3 mm., $\frac{1}{4}$ in. = 6 mm., 1-12 in. = 2 mm., etc.

The Working Distance of an objective is the distance between its front combination and the object when the latter is in focus, and is always less than the focal equivalent. The less the focal equivalent of the objective the less will be the working distance. Other things being equal, a long working distance is desirable, as it permits greater freedom of motion without danger of injury to object or objective.

Dry and Immersion Objectives.—A Dry Objective is one which when in focus is separated by a layer of air from the thin glass which covers the object. An Immersion Objective is one whose front lens when in use is connected with the cover glass by means of a liquid. This liquid may be water, when it is known as a Water Immersion lens, or it may be of some liquid, as thickened cedar oil, having practically the same index

of refraction as the glass of which the cover is made, when it is known as a Homogeneous Immersion objective.

Objectives of low or moderately high powers are nearly always dry objectives. High power objectives, as 1-10-inch and upwards, are nearly always immersion objectives.

Immersion objectives should never be used dry, or dry objectives with immersion liquids. The principles which govern the use of dry and immersion objectives will be again referred to and explained after the consideration of some other parts of the microscope.

The Ocular.—The ocular or eye piece (Fig. 19) is the lens or combination of lenses which is inserted into the top of the draw tube, and whose use is to magnify the image produced by the objective and transmit it to the eye. It acts as a simple microscope and gives a virtual image, which is not inverted, but has the same direction as the image from which it was formed.

When composed of more than one lens or combination, that next the eye is termed the Eye Lens and that turned towards the objective the Field Lens.

The ocular is subject to the same defects of chromatic and spherical aberration as the objective, and has these defects corrected in the same manner.

Of the many varieties of oculars which have been invented, only two are of sufficient importance to deserve attention, the Positive and the Negative, or Huyghenian.

The positive eye piece consists of a single lens, and magnifies the image formed by the objective. The Huyghenian eye piece consists of two lenses, the first, or field lens, of which acts like an additional lens of the objective and projects the image to a point between the field and eye lens. The eye lens in turn acts like a positive eye piece to magnify the image thus produced.

LIME COATING OF NUTMEGS.—The supposition that nutmegs are covered with a coating of lime to destroy the germinating power of the seed, is untenable, as this is accomplished by drying alone. It can, therefore, be done only as a protective against insects. To determine if the lime affords an effective protection against these, Tschirch (Schweiz. Wochens.) made parallel experiments with coated and uncoated nutmegs. Thirteen were dipped into dilute acetic acid to dissolve the calcium carbonate, washed in water and dried. These and an equal number of coated ones were placed in separate receptacles, and to each were added 50 specimens of *Sitotroga panicea*, a beetle very common in drug stores, in its various stages of development. In six months it was found that all of the lime-free nutmegs had been attacked and the bottom of the vessel was covered by a thick layer of powder. Of the coated ones only a single one had been attacked, only one hole being visible at a spot relatively free from lime. There can be no doubt, therefore, that the coating of calcium carbonate protects the nuts from this insect, at least, although the protection is not absolute. A microscopical examination showed that the action of the lime is not that of a poison, but is purely mechanical. It kills the insects by closing up and covering with a crust of lime all of their organs, so that every function must cease. (Südd. Ap. Zig.)



Fig. 19.

VANILLA IN COMMERCE*.

BY ADOLPH HENNING.

The United States is the largest consumer of vanilla. We use more than all the rest of the world combined, and chiefly the best kinds produced.

The vanilla most used and best known in this market is the pod of vanilla planifolia, grown in Mexico, chiefly near Papantla.

It is the best flavored vanilla of all that come to this market. The pods are from five to eight and a half inches, sometimes, nine inches, in length, round and tapering at both ends, with a hook at one end; in color they vary from a reddish-brown to almost black, and when of prime quality are of a dark-colored chocolate color, with a thin, smooth, oily epidermis and quite pliable. As found in market in recent years they rarely have a covering of crystals.

The Bourbon or Reunion vanilla is next in point of quality and flavor. It resembles Mexican very much in general appearance, excepting that it is generally covered with crystals of vanillin.

The odor of this variety is not so fine as that of the Mexican, being "pruney," though an extract made from the best Bourbon fruit compares very well with one made from the best Mexican.

In color and quality the Bourbon range from the very worst to the very finest, and in size from very small to very large, 4 to 8½ inches in length. The vanillin crystals also vary much, there being long snow-white crystals, white matted masses resembling cotton, and light and dark yellow crystals. This variation in color of crystals is due solely to their age.

Vanilla imported from the Island of Mauritius resembles the Bourbon very much, its color ranging from a reddish to a dark-brown. The crystals of vanillin appearing upon them are usually very handsome. The Mauritius, as also the Bourbon vanilla is chiefly imported from France.

The Seychelles Islands furnish us with vanilla much inferior to any of those previously mentioned. Its odor is often "smoky" or "inky." The pods range from 4 to 8½ inches in length and are of a light-brown to dark-brown color. They are generally nicely crystallized. England is the chief market for this variety.

From Guadeloupe we receive vanilla known as the "South-American," which resembles the Mexican very much in appearance, though much inferior in odor. The pods average from 6 to 8½ inches in length. The epidermis is quite hard, with longitudinal furrows. They are never offered in this market as South-Americans.

In addition to the so-called South-American vanilla, we receive from Guadeloupe a variety known as "vanillon." Its odor is that of heliotrope, even surpassing that of the Tahiti vanilla. Its pods are very short, thick and flat, from 4 to 5 inches in length, have a twisted appearance and are dark-brown color. They never crystallize.

Pompona is derived from Mexico. Though it is usually known as "wild vanilla" it is generally accepted that it is not the fruit of wild *V. planifolia* plants, but of the *V. Pompona*. The natives, however, state that the *V. Pompona* is the ancestor of the *V. planifolia*, and that the latter is the result of cultivation. Its odor is similar to that of the Tahiti, and the pods are very short and thick and covered with a rough skin. Only very small quantities are brought here.

A variety rarely met with in this market is the Java vanilla. Its odor is much stronger than that of the Mexican pod and equally fine. Its color is reddish-brown; the pods are from 4 to 6 inches in length. When sound and of prime quality, it is nicely crystallized. It is chiefly consumed in Holland.

Mexican vanilla frequently comes to this market cut up into pieces from ½ to 1½ inches in length, and known as "cuts." These are of inferior quality, being made from wind-falls, pods picked before maturity, split pods and such as are too small or unsightly to pack in bundles.

The Mexican vanilla, owing to its exquisite odor, commands the highest prices. At present, owing to successive short crops, since a heavy snow storm and killing frost visited the vanilla district in 1893, the ruling prices are from 50 per cent. to 100 per cent. higher than formerly. Short and inferior pods bring \$9, while prime ones sell as high as \$16 per pound.

Bourbon and Mauritius vanilla sell at from \$4.50 to \$8; Seychelles brings from \$2.50 to \$5; Guadeloupe, from \$3 to \$5; Tahiti, from \$2.50 to \$3.50; vanillons, from \$2.50 to \$5; and Mexican cuts, \$9.

As previously stated, these prices are much higher than in former years. In 1894, Mexicans sold at \$7 to \$12; Bourbons, at \$4 to \$7; Tahitis, at \$1.25 to \$1.50; in 1895, Mexicans sold at from \$7 to \$10; Bourbons, at \$4 to \$8; Tahitis, at \$1.40 to \$1.70; in 1896, Mexicans sold at \$8 to \$11.50; Bourbons, at \$4 to \$7.50; Tahitis, at \$2 to \$3.40.

The consumption of vanilla is steadily increasing, as will be seen by the following figures, showing the importations into this country.

In 1884....	74,634 pounds	In 1891....	171,555 pounds
In 1885....	97,000 "	In 1892....	242,465 "
In 1886....	103,770 "	In 1893....	249,247 "
In 1887....	137,700 "	In 1894....	171,555 "
In 1888....	143,470 "	In 1895....	132,196 "
In 1889....	168,536 "	In 1896....	145,000 "
In 1890....	144,870 "	In 1897....	156,090 "

The marked falling off since 1894 is due to the short crop of Mexicans, on account of the frost previously mentioned.

It may be of interest to you to know what proportions of these vast quantities were Mexicans and what of the other leading varieties, so I will give a report for the last five years.

	Bourbon. Pounds.	Mexican. Pounds.	Tahiti. Pounds.
In 1893.....	274,544	170,620	27,588
In 1894.....	41,752	101,111	21,920
In 1895.....	25,998	90,752	15,446
In 1896.....	40,000	71,000	38,219
In 1897.....	58,521	65,378	32,191

The value of last year's importation was approximately: Bourbons, \$368,000; Mexicans, \$800,000; Tahitis, \$90,000.

The general quality of vanilla has changed in recent years to a noticeable degree. Mexicans are not quite so handsome as in former years, probably owing to the fact that, while then every curer and packer took pride in offering goods that surpassed those of his competitors, they now look after the pecuniary side only. Whereas crystallized Mexican pods were formerly of frequent occurrence, they now rarely possess any crystals.

Bourbon vanilla has on the other hand improved wonderfully, every new crop being an improvement on the preceding one. Only twenty years ago it was difficult to sell Bourbon vanilla in this market, while now we import almost as much of this variety as of the Mexican. Prime Bourbon pods are to-day handsomer in appearance than prime Mexican. The quality of Tahiti vanilla is much inferior to what it was a few years ago, owing to lack of care on the part of the curers.

The great rival of vanilla pods is vanillin. The consumption of the artificial vanilla flavor, vanillin, has increased wonderfully. It is scarcely ten years since it ceased to be a mere curiosity and began to be an article of commerce, yet it is estimated that during the past twelve months over 100,000 ounces have been used in this country. This is owing partly to its improved quality, but chiefly to its cheapness. While it sold at \$5 an ounce only two years ago, the price dropped to 90 cents prior to the going into effect of the Dingley Tariff, and it

*Delivered at a meeting of the New York College of Pharmacy, Jan. 18. Reported in the Era Jan. 27, page 130.

now sells at \$1.70. These low prices have induced consumers to use vanilla flavoring where they formerly used other flavors or no flavors at all. Its chief consumption is with confectioners and cracker bakers, on account of its being colorless, and on account of the ease and rapidity with which the extracts can be made. Recently a vanillin in large crystals has been made. It is prepared by slow crystallization instead of by precipitation. It is said to be much stronger and of better flavor than the small white crystals usually met with. It is of a light amber color and sells at about \$3 an ounce.

It may not be out of place to state here that vanilla extract made from vanillin should not be used immediately after being made. It should be allowed to stand about two weeks before being used, and should invariably be prepared with simple syrup after dissolving in spirit, because sugar has the property of bringing out the flavor.

It is a curious fact that the enormous increase in the consumption of vanillin has scarcely affected the consumption of the pods. This is probably due to the fact that vanilla flavoring is used in many instances where it was not used formerly.

VARIETIES OF CARDAMOM.

At the recent annual session of German naturalists Dr. Niederstadt, of Hamburg, stated that two varieties of cardamom are known to occur in commerce, namely the small or Malabar cardamom and the long or Ceylon cardamom, both derived from *Elettaria cardamomum*. The wild cardamom which comes from Borneo is without importance. Besides, various other varieties are put on the market—the Siam cardamom, from *Amomum verum* and *rotundum*, and the wild or bastard cardamom, resembling the Malabar cardamom, which is said to be derived from *Amomum xanthioides*. This variety has met with a decided refusal in European markets, but is not without importance, as it is sometimes employed as a substitute for good varieties or for adulterating them. An admixture of such bastard cardamom is betrayed by the inferior odor and taste. It is, however, not without value to compare the following figures of analysis:

Genuine shelled cardamoms contained:

	Per Cent.
Water	15.25
Extract soluble in ether	5.10
Ashes, including dirt	0.55
Starch and sugar	28.84
Wood fiber, nitrogenous matter, extractive matter	44.26

Distilled with water, the volatile oil passed over, which has to be agitated with ether. According to Koenig it amounts to about 3.8 per cent.; but Niederstadt has come across crushed cardamoms in commerce which contained only 0.28 per cent. of essential oil.

Bastard cardamoms contained:

	Per Cent.
Water	15.50
Extract soluble in ether	4.04
Ashes, including dirt	7.50
Starch and sugar (sugar 0.42 per cent.)	24.00
Wood fiber, substances containing or free from nitrogen	48.96

Hence outside of the smaller percentage of fat, oil and essential oil, the two do not show any marked difference. The bastard cardamom, however, has a much more intense camphorlike odor and taste, and leaves a sense of scratching and biting in the throat and on the tongue. Besides, the bastard cardamom is dirty gray, while genuine cardamom is yellowish-white. This lighter color, however, is not a natural one, but is produced by a bleaching process with sulphurous acid. This explains why sulphuric acid is frequently found present in the official cardamoms.

A useful estimation of genuine cardamoms may be found, according to Scherer, on the fact that they always contain slight quantities of manganese. If manganese is easily detected in the ashes, the presence of genuine cardamom may be inferred.—Drogen und Farbw. Haendler.

AUTHORS AND THE JOURNALS.*

BY SETH SCOTT BISHOP, M.D., LL.D.

The rights and relations of authors and the journals are subjects not only of great interest, but they are of paramount importance. The position of an editor of a journal is not unattended with perplexing questions to solve and difficult tasks to perform. He stands between his contributors, reviewers and readers as a sort of literary clearing house, and he must guarantee fairness and honesty to all.

In the matter of articles contributed for publication the editor must consider first the interests of his subscribers. It is a delicate and disagreeable task to decline a paper volunteered to one's columns, no matter upon what ground. The contributor is quite certain to place his own construction on the reason given and think it in the nature of a pretext. If it is his first effort he may be discouraged, notwithstanding his consciousness of ability; if he is not a "first offender" he may be angered. But the editor is the best judge of his patrons' wants.

The right of an editor to alter the manuscript of a contributor is often questioned. There are inalienable rights attaching to authorship. Manifestly, the editor has no right to change the meaning of an author. For want of space he may abridge matter, with an author's consent, omitting that which may not be pertinent, or necessary to the comprehension of the writer's thoughts; but he has no right to alter an author's words so as to change his meaning. Otherwise the language becomes that of another, and is no longer an exponent of the author's mind.

On the other hand, an editor cannot be expected to mar the character of his journal by the appearance of anything which will prove discreditable to it. He must be a judge not only of the soundness of the material offered for publication, but he must see that the grammar and the rhetoric do credit to a journal of literary merit. Unfortunately, many persons of high professional attainments have neglected the acquisition of a literary education as a preliminary to their professional training. Their experience is of inestimable value to their contemporaries, and it would be unjust to all concerned to discourage the publication of their observations. The information which they can impart is paramount; the language is secondary to the thought. But there are ways in which this class of contributors may acquire themselves with a maximum of credit, and embellish their professional literature. Accessible to them are trained persons, teachers in our schools, etc., who would gladly earn a few extra dollars by straightening out the tangled threads of grammar and polishing off the warts of rhetoric. There are those who are wise enough to avail themselves of such helps to remove the blemishes that disfigure their excellent work.

But there are editors who accept articles, change their punctuation, wording and construction of sentences, and omit whole sentences and paragraphs that are pertinent, and material to a complete understanding of the subject in hand, and all this without the consent or knowledge of their contributors. The astoundment and vexation of authors on seeing their productions appear in such mutilated form can scarcely be expressed in elegant diction.

Proof of an article is an author's due; but its prompt correction, with as few material changes as possible, and its early return are obligatory on the writer. Common practice makes common law, and these rules are commonly observed among authors, editors and publishers. Moreover, when a manuscript is placed for publication it should be in the final form in which it is to appear, without material alterations, for when it is once in type it cannot be essentially changed in wording without additional cost to the publisher.

*Abstract of a portion of a paper in The Laryngoscope.

PHARMACY.

A PERFUMED DISINFECTANT.—To remove the inconvenience suffered by travelers through the disinfecting process of quarantine stations, Gawolowski recommends the application of a disinfectant prepared by introducing sulphurous acid gas at a low temperature into alcohol until saturated, and then adding thymol and suitable perfumes.—*Pharm. Centrall.*

DISSOLVING CARBOLIC ACID.—W. O. Sylvester, Port Huron, Mich., finds that a convenient method is to add to the acid five per cent. of water. If this is not sufficient to fill the bottle, add sufficient liquefied carbolic acid to fill to the neck of the bottle. Cork tightly and invert the bottle. In a few hours the acid will be dissolved.

APPLICATION OF EUROPHEN IN DERMATOLOGY is again highly recommended of late, by van der Spek (*Med. Weekbl.*). It is stated to be serviceable for all varieties of ulceration. Good results have also been obtained in the treatment of chilblain, burns, and soft chancre. The treatment was in form of powder, pure and with 1 to 3 times its weight of talcum, or as 4 to 10 per cent. ointment. (*Ap. Ztg.*)

EMULSION OF COD LIVER OIL.—Irish moss, 15; water, 1,300. Make a decoction and strain. In 150 of this decoction dissolve sugar, 25; and add to the cold solution cod liver oil, 80. Shake well together in a bottle. A perfect inseparable emulsion will result, in which no oil globules will be visible, even with a lens. (*Répertoire de Pharm.* (3), ix., 479, after *Giorn. de Pharm. de Trieste*; *Pharm. Jour.*)

TOXICITY OF CREOSOTE AND GUAIACOL AS COMPARED WITH CREOSOTAL AND GUAIACOL CARBONATE.—Dr. W. Hesse has confirmed, by experiments with dogs, previous statement to the effect that creosote and guaiacol are toxic and cause death in large doses, through their irritant and caustic action. Similar experiments with creosotal and guaiacol carbonate showed that they may be taken in large doses without affecting the general health. (*Med. Wochensch.*, through *Ap. Ztg.*)

FLUID FOR REMOVING RUST FROM IRON AND STEEL.—Make a mixture of lactic acid (1 part) and oil of spike (2 parts), and rub it upon the rust spots with a woolen cloth or tissue paper. On the following day the rust may be removed entirely with the aid of a little oil of spike. The iron is not affected in the least by this treatment, which cannot be said of mixtures containing hydrochloric acid. Iron and steel surfaces are best polished with very fine emery paper and oxide of tin. (*Südd. Ap. Ztg.*)

USES OF THIOL.—Thiol is recommended for skin affections whenever it is desired to reduce swelling, to effect drying, to cover the skin closely and to lessen the troublesome itching which much retards the healing. The following forms are used: (1) For painting, pure thiol; thiol with 5 per cent. glycerin; thiol (10 per cent.) with flexible collodion. (2) For compresses a 10 per cent. solution of liquid thiol in water. (3) As dusting powder, dry thiol or equal parts of thiol and talcum. (4) As 10 per cent. thiol-vaseline. (5) As powdered neutral 5 per cent. thiol-soap. (*Aerzt. Prax.*, through *Ap. Ztg.*)

PREPARATION OF TANNON.—A process recently patented is as follows. 1.4 parts of hexa-methylene tetramine (prepared by evaporating to dryness a mixture of formaldehyde with an excess of ammonia) are dissolved

in 20 parts of water, and 3.2 parts of tannin, dissolved in 20 parts of water, slowly added with stirring. The precipitate formed is pressed to remove liquid, reduced to small particles and slowly heated to 100° C. The mass first becomes liquid, gradually thickens and finally forms hard lumps. The same result may be attained by boiling the precipitate for some time with glycerin or water. (*Ap. Ztg.*)

ACETO-PHENONE-ORTHO-OXY-QUINOLINE is obtained by the interaction of a halogen-aceto-phenone with ortho-quinoline in presence of suitable solvents and an alkali. (The corresponding meta- and para-compounds are obtained in a similar manner.) The compound is an energetic base and forms well crystallizing salts. It is soluble in alcohol, chloroform, and acetone and crystallizes in fine needles, which melt at 130° C. It is decidedly hypnotic and antineuralgic. As advantages over aceto-phenone are mentioned the facts that it is inodorous, nearly tasteless and non-irritating to mucous surfaces. (*Ph. Centrall.*, through *Bull. Comm. de Ph.*)

DESICHTHOL.—Dr. O. Helmers, who has been engaged in studying the composition and properties of ichthyol, has succeeded in removing from it the substance causing the disagreeable odor, without otherwise changing the physical properties or its appearance, by a treatment with steam, under proper precautions. About 0.5 per cent. of a volatile oil was separated, to which the disagreeable odor was due. This oil is stated to possess strong chemical affinities and therefore plays probably an essential part in the therapeutic action of ichthyol, and a modification of the curative value may be expected in the deodorized preparation. This is placed on the market under the name "Desichthol." (*Ap. Ztg.*)

COLORING MARBLE AND SIMILAR STONES.—A newly discovered process for treating marble or other similar stones in order to give them any colored shade, veins or spots, says an exchange (*W. Dr.*) consists in leaving these stones in one or more baths composed of a solution of alcohol and one or more colors of aniline or other coloring materials. The coloring materials are fixed by leaving the colored stones in a bath of oil or any other fat substance, or by applying upon the stones layers of the same stuff. The absorption of the organic coloring materials and of the fat substances by the stone may be accelerated by heating or boiling the bath which contains the stuff to be treated.

QUINOCHLORAL, as prepared by K. Meyer, is a thick, oily liquid, of neutral reaction and very bitter taste, and soluble in aqueous and alcoholic liquids in all proportions. It is exempt from the irritating action of quinine and chloral, does not affect the action of the heart and is used principally as a substitute for antiseptic metallic salts and phenols. Comparative experiments with corrosive sublimate and quinochloral have shown that bacteria subjected to the influence of the latter are destroyed in shorter time than those exposed to the action of corrosive sublimate. Quinochloral is given in doses of .05 to 1 Gm. (4.5 to 15 grains) as an internal antiseptic. In large doses it is useful as a hypnotic, particularly in delirium tremens. (*Ph. Ztg.*)

PREPARATION OF NEARLY INODOROUS COMBINATIONS OF IODOFORM WITH ALBUMINS.—On mixing solutions of albumins (from eggs, milk, etc.), and of iodoform in presence of a precipitant of albumins, e. g., alcohol, a precipitate consisting of albumin and iodoform is formed, from which all iodoform can be removed by means of some liquid in which the latter is soluble. If, however, the precipitate is heated a few hours at 120° C., the greater part of the iodoform, about 15 per cent. of the precipitate, combines with the albumin, so that only small quantities of it can be removed with a solvent. The preparations so ob-

tained form nearly odorless and sterilizable powders possessing all the valuable properties of iodoform. (Chem. Ztg., through Ap. Ztg.)

ALSOOL is a trade name for aluminum aceto-tartrate, which is recommended as a non-toxic substitute for potassium chlorate, carbolic acid or corrosive sublimate, and more particularly as a gargle in 0.5 to 1 per cent. solution containing glycerin and sugar. It is in the market also in form of a 50 per cent. solution. The salt is prepared by a patented process as follows: Five parts of basic aluminum acetate are dissolved in water with the aid of 3 parts of tartaric acid. The solution is evaporated to dryness, the residue dissolved in a little water and the double salt precipitated with alcohol. Alsool is composed of alumina 25.35 per cent., acetic acid 27.83 per cent., tartaric acid 27.78 per cent. and water 18.81 per cent. The 50 per cent. solution in cold water does not become turbid or gelatinous on warming and is of acid reaction. (Ph. Post.)

EMULSIFICATION OF COD LIVER OIL is effected by E. Barby with Irish moss (*Chondrus crispus*) as follows: The mass is well cleaned by washing and then boiled with water [proportions not mentioned]. In 150 gm. of the filtered decoction 25 gm. of sugar are dissolved and this solution well shaken with 80 gm. of cod liver oil. A perfectly homogeneous, white emulsion is so obtained, which shows no sign of separation after standing eight or ten weeks. Barby also found that cod liver oil is frequently adulterated with foreign oils and even with colophony. In presence of the former, no red color reaction can be obtained on mixing the oil with fuming nitric acid, while the resin is detected by thoroughly shaking 1 part of the oil with 10 to 12 parts of ether, its presence being indicated by a decided turbidity within a few minutes after shaking. (Boll. Chim. Farm., through Südd. Ap. Ztg.).

PHOSPHITES OF GUAIACOL AND CREOSOTE. —In view of the fact that more efficient phenol derivatives than those already known are desirable for the treatment of tuberculosis, new esters of guaiacol and creosote, the phosphites, have been prepared. These esters are rich in phenols and are claimed to be of particular value on account of the combined beneficial effects of phenols and phosphorus. The process of manufacture is patented by P. Ballard, of Montpellier. Guaiacol or creosote is mixed with an alcoholic solution of soda, or the alkali salts of the phenols are suspended in absolute alcohol. Phosphorus trichloride is then slowly added, the mixture being kept cold during the reaction. Guaiacol phosphite is a white crystalline powder having a feeble odor of creosote. It is readily soluble in alcohol, ether, chloroform, glycerin and fatty oils; sparingly soluble in water, benzol and acetone. It melts at 90° C. and contains 92.25 per cent. of guaiacol. Creosote phosphite is a yellow semi-fluid mass having a slight creosote odor. (Ap. Ztg.).

METHYLENE-BLUE IN MALARIA. —According to statements of Dr. Cardamites (Med. Wochensh.) methylene-blue is much superior to quinine in malaria. The author prescribes four doses daily, to be taken at intervals of two hours, in wafers with powdered nutmeg or in an infusion of nutmeg. The daily doses are: For adults 10 to 12 grains, youths 8 grains, children 6 grains and infants 1 to 2 grains. It is best taken ten hours before an expected attack of fever; in remittent fever eight hours before a longer remission. In cases in which methylene-blue as well as quinine failed, the author obtained good results with a combination of both. Less satisfactory was a combination of methylene-blue with arsenic preparations. As disadvantages of the remedy are mentioned inflammation of the bladder, which is easily caused by it; staining of mouth and clothes when it must be administered in solution, and coloration of vomited matter. Against these disadvantages there are the important facts of its effective curative and immunizing powers. (Ap. Ztg.).

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Information Wanted.

(C. E. M.) wants information concerning "a cord of some considerable strength, made of non-combustible material."

(Laviendes) wants a process for making the wax paper used on mimeograph and similar machines.

Bleaching Sponges.

(P. & O.) See this journal, March 25, 1897, page 363.

Melol.

(H. C. C.) Metol is the trade name given to a salt of methyl paramido metacresol. It takes the form of a whitish powder soluble in water and when employed with alkaline carbonates it forms a very energetic developer for gelatino-bromide dry plates, or in a more diluted form it can be used for gelatino-chloride, or chloro-bromide gelatine plates. It is said that a solution of it with alkalis in presence of alkaline sulphites will remain colorless for a great length of time.

Patent Leather Varnish.

(J. D.)		
(1) Shellac	.....	2 ounces
Gum turpentine	.....	¾ ounce
Sandarach	.....	144 grains
Lampblack	.....	72 grains
Oil turpentine	.....	¾ fl. ounce
Alcohol	.....	19 fl. ounces
(2) India rubber	.....	½ ounce
Shellac	.....	8 ounces
Camphor	.....	1 ounce
Xiprosin	.....	1 ounce
Wood alcohol	.....	24 ounces

Dissolve the rubber in the alcohol by the aid of a moderate heat, and add the other ingredients.

Apothecaries in the Navy.

(H. H. L.) The apothecaries in the Navy are required to be enlisted men who are graduates in pharmacy and have passed an examination before a board composed of three medical officers of the navy. The scope of this examination is shown in Naval Regulations Circular No. 2, dated March 13, 1893, which we presume may be obtained by addressing the Chief of the Bureau of Navigation, Navy Department, Washington, D. C. The pay is \$60 per month. See also articles on this subject in previous volumes of the Era. Consult the indexes. For particulars regarding hospital stewards in the Marine Hospital Service, see this journal, Jan. 20, 1898, page 97.

Bay Rum For Barbers' Use.

(O. B. L.) A cheap bay rum for barbers' use may be prepared from the formula given in this journal, May 6, 1897, page 543. Here are two others:

(1) Oil of bay	.....	1½ fl. drams
Oil of pimento	.....	¾ fl. dram
Acetic ether	.....	1½ fl. drams
Alcohol	.....	2 pints
Water	.....	2 pints

Mix the oils and acetic ether with the alcohol, add the water and filter.

(2) Oil of bay	.....	2 fl. drams
Jamaica rum	.....	4 fl. ounces
Alcohol	.....	1½ pints
Water	.....	2½ pints

This preparation may be made clear and bright by filtering through magnesia and charcoal.

Bird Tonic.

(W. L. B.) (1) The Era Formulary gives the following under "Douglass' Mixture," a tonic recommended for moulting birds:

Ferrons sulphate	1 ounce
Dilute sulphuric acid	1 dram
Water	1 quart

Make a solution and put one teaspoonful in each quart of drinking water.

- (2) Compound tincture of cinchona... 2 fl. drams
 Compound tincture of gentian... 2 fl. drams
 Syrup of orange 1 fl. ounce || Simple elixir | 2½ fl. ounces |

Put a few drops on a lump of sugar in the cage once daily.

Glycerole of Chloride of Iron.

(A. R. G.) There is no specific formula under this title. A typical preparation containing glycerin, and one which disguises the styptic taste of the iron chloride very well, is the "syrup of ferrous chloride" of the National Formulary. Here are two formulas, the last one being said to produce a non-alcoholic preparation similar to some of those upon the market:

- (1) Tincture citro-chloride of iron, N. F. ... 1 ounce
 Glycerin 4 ounces || Syrup, enough to make | 16 ounces |

(2) Fifteen Cc. of U. S. P. solution of ferric chloride are mixed with 390 Cc. of glycerin and 5 gm. citric acid are dissolved in 30 Cc. of water, and the two solutions mixed. Then enough ammonia water (about 33 Cc.) is added to nearly neutralize the product, leaving it slightly acid. Then dilute with water to 480 Cc. Each fluid ounce is equivalent to 60 minims tincture of ferric chloride.

Cosmetic of Suet and Glycerin.

(H. L. C.) You give us but little information of the kind of "cosmetic" you want. If it be of the nature of a pomade the following may answer:

Suet, prepared	3¼ ounces
Sweet almond oil	6 ounces
White wax	1 ounce
Spermaceti	½ ounce
Lanolin	2 ounces
Borax, powdered	½ dram
Glycerin	2 ounces
Rose water, enough to make ..	16 ounces

Melt the wax and spermaceti; add the suet, lanolin, and oil, add the borax dissolved in the glycerin and rose water, and stir until cool. Perfume may be added if desired. If the resulting pomade be too hard, lessen the amounts of wax and spermaceti and increase the quantity of almond oil. Whatever formula you may employ a little experimenting is necessary to produce the desired results.

Witch Hazel Toilet Cream.

(O. B. L.) If you were to use a light colored tragacanth you would have no fault to find with the formula given in this journal, Oct. 7, 1897, page 503. However, here is another formula:

Quince seed	3 ounces
Boric acid	1½ drams
Carbolic acid	1 fl. dram
Distilled extract of witch hazel ..	2 fl. ounces
Glycerin	6 fl. ounces
Perfume extract	2 fl. ounces
Water, enough to make	4 pints

Pour 32 fluid ounces of boiling water upon the quince seed, add the acids, macerate for several hours, stirring occasionally, decant the liquid, upon the residue pour 16 fluid ounces of boiling water, macerate again and decant as before, mix and strain the two liquids, add the glycerin, distilled extract of witch hazel and perfume, and finally the remainder of the water. The quantity of distilled extract of witch hazel may be increased if desired, omitting, of course, a corresponding quantity of the water.

Gout and Rheumatic Pills.

(X. Y. Z.) We cannot give the formula for the proprietary article. We quote, however, a few formulas for pills of this character which are quite well known and of considerable popular acceptance:

(1) Becquerel's Gout Pills:

Quinine sulphate	100 grains
Extract digitalis	15½ grains
Colchicum seed	38½ grains

Make into 50 pills. Dose, 1 to 3 pills daily for several days.

(2) Lartigue's Gout Pills:

Compound extract colocynth	20 grains
Extract colchicum	60 grains
Extract opium	1 grain

Make into 18 pills. Dose: One or more according to their purgative effect.

(3) White's Gout Pills:

Calomel	1 dram
Powdered scottrine aloes	1 dram
Ipecac	1 dram
Acetic extract colchicum	1 dram

Make a mass with syrup and form into sixty pills.

Remedies for Dandruff.

(W. S.) The formula for dandruff, this journal, Feb. 10, 1898, page 210, is probably as satisfactory as any. Some other formulas for remedies of this character may be found in the Era of April 8, last year (page 423). Here are two others:

Salicylic acid	25 grains
Glycerin	1 fl. dram
Dilute alcohol	2 fl. ounces
Oil of wintergreen	3 minims
Oil of rose	1 minim
Oil of neroli	1 minim
Water	4 fl. ounces

Mix the acid and oils with the alcohol and glycerin, add the water and filter.

- (2) Betanaphol 6 drams || Glycerin | 2 fl. ounces |
| Oil wintergreen | ½ fl. dram |
| Oil rose | 10 minims |
| Oil neroli | 10 minims |
| Terpineol | 10 minims |
| Oil of orris | 5 minims |
| Hellotropin | 1½ grains |
| Tincture quillaja | 30 fl. ounces |

Wash the hair, dry it, apply the above lightly with a sponge, tie a cloth over the head, and allow it to remain for one-half hour. (Dieterich.)

Mixed Bird Seed and Bird Food.

(W. L. B.) The Era Formulary gives the following:

- (1) Canary seed 4 parts || Hemp seed | 5 parts |
| Millet seed | 1 part |
| Maw seed | 1 part |
| (2) Canary seed | 5 parts |
| Hemp seed | 3 parts |
| Rape seed | 1 part |
| Millet seed | 1 part |

A "German paste" or canary food may be prepared as follows:

Corn meal	8 ounces
Blanched sweet almonds	4 ounces
Fresh butter	1 ounce
Powdered sugar	1 ounce
Saffron	5 grains
Eggs, 1 or 2	

Pass the egg through a fine grater, and add to the other ingredients. Beat to a smooth paste with cold water, and granulate the mass by passing through a coarse grater; then expose the product to the air in a warm place until quite hard and dry.

Bird Food.

Pea meal	1 pound
Coarse sugar	½ pound
Fresh butter	2 ounces
Yolks of eggs, two ..	

Mix these well together and brown gently in a frying pan. When cold mix well with:

Poppy seed	2 ounces
Bruised hemp seed (separated from the husks)	2 pounds

Tooth Soap.

(Laviendes.)	
(1) Castile soap	1 pound
Prepared chalk	1 ounce
Carbolic acid	20 grains
Oil wintergreen	30 minims

Shave the soap into ribbons, beat into a paste with a little water, and add first prepared chalk, and lastly the carbolic acid and wintergreen oil dissolved in a little alcohol.

(2) Dentist Frohmann, of Berlin, offers the following: Thymol 0.25 gm., extract of krameria 1 gm.; these are to be dissolved in 6 gm. of hot glycerin, then calcined magnesia 0.5 gm., powdered borax 4 gm., and powdered soap in sufficient quantity are added to make 30 gm. of product to which 1 gm. of oil of wintergreen is added.

(3) White castile soap, powdered	10 av. ounces
Tincture of rhathany	3 1/4 fl. ounces
Precipitated chalk	3 1/4 av. ounces
Benzoic acid	1/2 av. ounce
Potassium chlorate, powder	1/2 av. ounce
Borax, powder, ...	1/2 av. ounce
Saccharin	40 grains
Oil cinnamon, sufficient to flavor.	

Make into a hard mass by the addition of glycerin and water, press into tin boxes, and dry.

Curacao Alb.

(S. B.) asks what should be dispensed for "curacao alb." in the following:

B	
Strych. sulph.	gr. j
Tr. ferri chlor.	5 iij
Acid acetic.	5 j
Curacao alb.	5 vj
Liq. ammon. acet.	5 ij
Syr. acid. cit.	5 j
Aqua	q. s. ft. 5 vj

M. Sig. Teaspoonful every four hours followed by half a glass of water.

This prescription is evidently a modification of the well-known formula for Basham's mixture (solution of iron and ammonium acetate) of the pharmacopoeia, and though we know of no preparation by the distinctive name, "curacao alb.," we think the prescriber had in mind some adjunct in which oil of curacao orange was employed as a flavoring ingredient. We should have no hesitation in dispensing the prescription, using for the "curacao alb." the same quantity of elixir of curacao of the National Formulary, though the official aromatic elixir would answer the same purpose. Before dispensing the prescription, the prescriber should be consulted upon this point, if he can be found.

Benzoinated Lard.

(W. J. L.) The present official process has proven very satisfactory. In the Pharmacopoeia of 1870 it was directed to melt 16 troy ounces of lard on a water bath and add two fluid ounces of tincture of benzoin. The mixture was then constantly stirred until the alcohol was evaporated, removed from the water bath and the stirring continued until the ointment was cool. This process was discarded in the next edition of the Pharmacopoeia (1880) and the title of the preparation changed to "Adeps Benzoinatus." The addition of tincture of benzoin to lard was found by many to be objectionable as the product thus prepared is much darker and less fragrant and the ointment so made tends to act as an irritant when applied in the treatment of certain diseases of the skin.

Another process for preserving lard proposed by Hirzel is the following, which he claims is suitable for other animal fats: Mix 14 pounds of the recently melted fat with 5 drams of common salt and 15 grains of alum, in fine powder, heat till a scum is formed on the surface, separate the scum, and when the clear liquid has cooled, wash it many times with water with malaxation, so as

to remove all the salt, then evaporate the water at a heat insufficient to injure the fat.

Citrine Ointment.

(W. J. L.) We can give no better method for the preparation of citrine ointment than that furnished by the Pharmacopoeia. Of many bases suggested lard oil seems to be the most satisfactory. The effervescence is due to the chemical reaction between the oil and nitric acid, the latter being reduced to nitrous acid and the olein of the oil being converted into eladin. Care should be taken not to raise the temperature above 100° C., and the acid should be of official strength. The effervescence produced proceeds quietly and a soft solid mass is obtained upon cooling. After the addition of the mercuric nitrate, the mass should be stirred constantly until cold, when it will have assumed a bright lemon-yellow color. Most of the trouble in the preparation of this ointment arises from the use of too much heat. The heat of a boiling water bath only should be used, as over a direct fire the temperature cannot well be controlled and, as a result, the fat is decomposed and a dark brown compound is produced. If the oil has been properly oxidized and cooled down, the solution of nitrate of mercury will not be reduced when added, and an ointment of a satisfactory color will be produced. Proctor ("Lectures on Practical Pharmacy") in discussing the keeping qualities of the British preparation, in which both lard and olive oil are employed, says that if long kept, the ointment becomes dark colored, the evaporation of nitric acid being one change, but perhaps not the only change, which it has thus undergone. He advocates, therefore, making only so much at a time as will be consumed before the change of color takes place.

Coating Enteric Pills.

(H. C. C.) Keratin coating has been especially recommended for pills which are not to be acted upon in the stomach, but to be soluble in the intestinal fluids. Both alkaline and acid solutions of keratin are employed. The former, used for coating pills containing pancreatin, trypsin, metallic sulphides, etc., is prepared by dissolving 7 parts of keratin in a mixture of 50 parts of 10 per cent. ammonia water and 50 parts of 60 per cent. alcohol. Acetic solution of keratin, adapted for pills containing ferric chloride, tannin, salicylic acid, arsenic, creosote, and the salts of mercury, gold, silver, etc., is made by dissolving 7 parts of keratin in 100 parts of glacial acetic acid, assisting solution if necessary by the aid of a moderate heat.

Caspari (Treatise on Pharmacy) gives the following practical observations: All pills intended to be coated with keratin must be made with some fatty excipient and contain no appreciable moisture; the mass is best made with cacao-butter and oil of sweet almond, or a mixture of purified mutton tallow or cacao butter 10 parts, and white or yellow wax 1 part. After the pills have been rounded they should be dipped in melted cacao butter, which is allowed to harden; they are then placed in a porcelain dish, the keratin solution added (about 30 or 40 drops for 100 pills of medium size) and rotated until the pills have become thoroughly moistened, after which they are dried on parchment paper, to which they will not adhere. The application of keratin solution must be repeated three or four times and allowed to dry each time. For chemically indifferent substances, either the alkaline or acid solution of keratin may be employed. To avoid the tediousness of coating with keratin, salol coating has been recommended, which is best applied by melting salol in a dish and dipping the pills, fixed on needles, into it, afterward closing the small needle-holes separately. Salol, like keratin, is insoluble in the gastric juice, but the coating has not been found so satisfactory. For a practical paper on coating pills with salol, see this journal, Aug. 5, 1897, page 176.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, MARCH 17, 1895.

No. 11.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates:
U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483, NEW YORK.
Cable Address: "ERA"—New York.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL..... 385	Phenacetine Smuggler on Trial..... 405
CORRESPONDENCE..... 388	Price of Turpentine..... 405
ERA COURSE IN PHARMACY..... 389	Boston Druggists Respect Law..... 406
Inorganic Chemistry..... 389	Protective Association for Wholesalers..... 406
Pharmaceutical Microscopy..... 391	Drug Trade Bowling..... 406
Practice of Pharmacy in Russia..... 394	NEWS LETTERS..... 407
Leaks, and How to Prevent Them..... 397	ASSOCIATIONS..... 415
PHARMACY..... 399	DRUGGISTS' ADVERTISING..... 417
QUESTION BOX..... 400	BUSINESS RECORD..... 418
NEWS AND TRADE DEPARTMENT..... 403	English Pharmaceutical Affairs..... 419
Shorter Hours Bill Passed by Senate..... 403	BOOK REVIEWS..... 419
Hunyadi Trade-Mark Suit..... 403	ORITARY..... 420
Look Out for the Swindlers..... 404	BOARDS AND COLLEGES..... 420
	STATE OF TRADE..... 421
	MARKET REPORTS..... 422

"The British and Colonial Druggist," London.

Subscriptions and advertisements for this weekly drug journal will be received and forwarded through this office. Specimen copies and schedule rates will be furnished upon application.

VETERINARY REMEDIES.

Every druggist counts upon a profit arising from the popular belief that sarsaparillas and blood purifiers are the proper things to buy in the spring. This trade is so firmly established that it needs but little stimulation, but there is a chance to extend business by extending the idea to include similar treatment of domestic animals. This will tend to increase the trade in veterinary medicines, and the pharmacist who desires to profit from the compounding of such preparations has need of a good collection of formulas to draw from. The Era Formulae supplies this need most acceptably. Among its 5,000 formulas there are 456 for veterinary remedies, which include nearly everything required in veterinary practice, especially condition powders, liniments, worm remedies, hoof preparations, etc., so much in demand among stockmen during the spring season. The price of the book is \$5 per copy, and in addition to the feature mentioned, the druggist secures 4,544 other formulas for articles in the drug line.

The Board of Health and Commercial Enterprises.

We have had considerable to say of late regarding the so-called Brush bill before the Legislature of this State and on the general subject of commercial manufacture and sale of antitoxin by the board of health.

The function of boards of health to supervise the measures that make for better public health, to detect impurities in products of all kinds, to provide for the poorer classes, etc., is fairly well defined. Preparing antitoxin for home distribution, testing products offered in the markets of the city, etc., are all legitimate; but preparing any products, no matter what the name or class—sugar, calico, leather goods, biological products, etc., for commercial ends is not legitimate. Confining these remarks to diphtheria antitoxin, the leading product of the laboratory of the board, it is to be observed:

1. That there is no excuse for the commercial end in this matter. True, the board introduced antitoxin treatment in New York City, and materially expedited its introduction elsewhere in this country. True, the board prepared the first domestic antitoxin, but these constitute no license to enter the domain of the manufacturer. With all due respect to the product of the local board, the sweeping claim of its worldwide superiority, made originally in an after-dinner speech by "one of the boys," is, to say the least, extravagant. The first concentrated antitoxic serum was not produced in any quantities in this city, nor is the highest concentration now in use a product of the board. Standardized serums, similarly, did not originate with it. These are considered the greatest improvements made in antitoxin. Again authentic figures do not show superior results from the exclusive employment of this product. However, the possession of all these qualities would not justify New York City, through her board of sanitary appointees, to enter the domain of commercialism.

2. The course the board has hitherto pursued is manifestly unjust toward reputable producers of such products. While the board was first in the production of a domestic product, these private concerns have been the servants of the greater public, with nothing in their special favor, while the remedy was being introduced. The burden of initial outfit and experimentation they have borne as individuals, and not as municipalities. These have been honorable in other lines of manufacture and, as the sequel has shown, have maintained their reputation with the great medical profession in the production of this most technical and expensive of all medicinal agents.

These producers supply the remedy as any other remedy must be supplied, e. g., quinine, morphine, etc. They find too much at stake to allow of anything but scientific work and to neglect developing other fields in biological research. They operate with private capital, while the New York Board of Health works with public moneys. Expense in production has not figured, for, as reports show, the product has cost the city too much money.

3. It is not economical. The excessive cost of antitoxin when produced under municipal control, as compared with purchasing in the open market products of determined value is an element of prime importance. It is not too high an estimate to state that one-twentieth of

the money expended annually in this way would purchase the best antitoxin to be secured anywhere, in sufficient quantity for the city's indigent poor and other municipal uses.

Glucose and Diabetes.

There has been very much confusion in the lay mind regarding the causes of diabetes. A certain writer has contributed very greatly to this popular confusion and has established a misconception through his energetic assertions in medical journals that glucose taken into the stomach would produce diabetes, and certain lectures, reports and articles of his presented to pharmaceutical associations boldly contended that glucose is absorbed directly from the stomach into the blood. However much such a theory and such a naïve disregard of the functions of the portal vein and liver might secure acceptance from the layman, and from that class of medical men who prefer to be told rather than learn for themselves, it is fortunate that the scientific members of the profession are not easily carried away by such false doctrine and system of physiology cut to fit a theory. One after another of the reputable and competent writers of the medical fraternity, both in this country and abroad, have laughed to scorn the pretensions of the writer referred to, whose ignorance is so patent and so easily exposed. Some not only hint, but broadly assert, that his utterances have been purchased, and have been just what the purchaser wished to have, regardless of sound therapeutic doctrine and ascertained facts.

A very thoughtful and scholarly editorial in a recent number of the *Journal of the American Medical Association*, furnishes a convincing criticism of the ignorance or design, or both, of him who has asserted this startling and novel theory. A portion of this editorial reads thus:

"Recently a writer in one of the medical journals of the Atlantic coast, endeavored to prove, first, that glycosuria is pathognomonic of diabetes, and second, that glycosuria would inevitably follow the taking of glucose into the stomach, since under these circumstances it would be absorbed directly into the general circulation without passing to the liver and as a result the patient would become diabetic. Such a woful ignorance of the distribution of the portal vein and of the fact that substances absorbed from the stomach go to the liver through the portal vein in the same manner as do substances absorbed from the intestine, seems to us inexplicable, and the assertion that the entrance of sugar into the stomach would result in diabetes because of its direct absorption, if true, would render most of the population of the United States sufferers from this disease; for, by this theory the conversion of starch into sugar will always result in diabetes, or at least in glycosuria, unless this conversion takes place in the small intestine. Such statements made by one who pretends to a knowledge of the physiology of digestion and assimilation in connection with the carbohydrates would not be worthy of attention were it not that they were presented to the medical profession in a journal of high repute and may serve to beguile the minds of those without careful thought and correct views as stated by a writer without carefully analyzing the physiologic and anatomic basis for his dogmatic assertions."

Commercial Profit in Industrial Research.

In this country chemists, and other professional men, strive to make their education a means of support just as quickly as possible. They have no time, nor can they afford, to study and investigate just for love thereof, but must earn their bread and butter by direct application of their knowledge. Whatever their discoveries or special achievements, they come as a natural result of their daily labors; they do not carry on laborious researches at great financial outlay in the hope that they may chance to discover something. The question with us is, will it pay, and if so, how soon? Of course in our universities and schools there are many chemists engaged in original research, but, with the exception of sac-

charin, they have contributed little to the resources of industrial chemistry. We do not say that American chemists make no discoveries, do no research work, for they do much, but what is done is not published to the world, it is a trade secret of their employers or themselves.

This condition of affairs has some good features, but there is necessity, or, at least, desirability, of more closely approaching the state of things existing, for instance, in Germany. The Germans excel in industrial chemistry and have established profitable monopolies on the basis of discoveries of methods of producing various costly products of nature. Some firms employ fifty or a hundred graduates of the universities in research, trusting for reward to the occasional discovery that gives a monopoly. This has been going on for years, so that Germany now easily leads the world in a certain line of chemicals, particularly the more expensive ones, which it pays to produce.

That this policy is good is proven by the achievements and rewards of such firms. The long and rapidly lengthening list of synthetic remedies is sufficient testimony thereto. Last year they added artificial indigo to their previous triumphs. A German manufacturing firm has placed on the market an artificial indigo which is identical in chemical composition and properties with natural indigo. It can be sold at a price that insures the makers a profit at present low prices. For a long time costly dyes have been imitated, or produced, on a commercial scale by German chemists. More recently they have added other monopolies of alkaloïds used in medicine. A third profitable chemical industry of theirs is the production of perfumes. Among the last of these is artificial musk. Another profitable discovery is ionone, or essence of violets. The hydrocarbons produce on proper manipulation a long series of odors which will make the fortune of the firms that have patiently produced them by protracted experiment. Let American firms do some of this work.

Physics and Botany.

The director of the Era Course in Pharmacy has received the following letter, which we give verbatim et literatim et punctuatim:

I want to inform you that you can take my name from the list of Era students as the lectures do not benefit me any at all not for the drug business as there was half of the lecture part that were of no particle use to the druggist. What do we care for physics. They could have published lecture that would be far more profitable than that, and now comes a lot of botany. There are very few druggists that care for anything like that. I have been in the drug business about eight years and never yet have I had one occasion to use botany. Those lectures would be all wriggle to a fellow in college but the class of students the Era has have very little time and what they do devote to study, they want something that will benefit them. Those chemistry lectures were fine and I enjoyed them very much, but when it comes to physics and botany I am out. I expect to still take the Era and read the lecture but do not expect to make a study of those botany lectures. You can forward this letter to the Era and let them see if they cannot find lecture that will benefit the druggist a little more. I have been through a course of botany and physics and never yet have used them in the drug business.

We are very sorry this correspondent has thus passed judgment, for he places his opinion in direct opposition to that of the best teachers of pharmacy and refutes the experience of the wisest and most practical of pharmacists. Physics is the very groundwork of all science, particularly of chemistry and microscopy, and its omission from this course would be a fatal defect, notwithstanding our friend's belief. Botany is the cornerstone of materia medica and pharmacognosy, and one might as

well try to walk without legs as expect to study these subjects without previous knowledge of botany.

But he weakens, in fact, destroys, his argument by admitting that he has previously studied these branches. Without this admission it would be hard to believe his other statement that he has been in the drug business for eight years, for no board of pharmacy in this country would allow anyone to practice pharmacy who was so confessedly ignorant.

Our friend puts himself in an attitude where it is hopeless to attempt to benefit him. If the student is to be the judge of what is good for him, is to be allowed to select his studies, no scheme of education will be acceptable. He would do well to take a humbler position, defer to the judgment of those older, wiser and more experienced, better competent to decide what he should have rather than what he may like. Out of his own mouth he condemns himself, and in addition to insisting upon the value of botany and physics in this course, his letter leads almost to the belief that it would have been wise to include penmanship, spelling and grammar also.

Why Go To The Klondike?

The dreamer or fakir, take your choice, who claims to be able to make gold out of base metals, has succeeded in interesting many gullible people and obtained much cash subscriptions to stock in a company to float his scheme. This man, E. C. Brice, says gold is not an element, but a compound, and argues in support of this assertion in a manner that is both funny and amazing. Some of his theories of chemical action are of the most astounding absurdity. Here is his way of making gold:

Take of chemically pure antimony, 5 parts; sulphur, 10 parts; iron, 1 part; caustic soda, 4 parts. Place these ingredients in a graphite crucible and expose to a white heat, or 5,000 degrees, from eight to forty-eight hours. Powder the resulting mass and mix it well to incorporate the metal with the slag. Combine this with charcoal, 1 part; oxide of lead, 5 parts, and caustic soda, 4 parts. Fuse the whole until a metallic button is obtained. Scorchify and expel this metallic mass and the resulting bead will be gold and silver.

Brice gives this to the public without fear, as he claims to have patented or applied for patents upon this process in all countries of the earth.

Chemists generally are laughing at his preposterous claims and pitying the poor dupes who may have parted with their cash to fill his pockets. They say that if he has shown gold as a product of his process (which he asserts and they do not deny), it was pre-existent in some of the materials employed, intentionally or accidentally present. Prior testing of each ingredient in his brew is recommended. They have not forgotten the excitement in France a few years ago, when a fakir succeeded in gathering in several millions of francs upon his representation and apparent proof that he could make cane sugar from glucose and glucose-containing juices. Saccharate of lime used in one of the steps of the process was his "little joker."

Scientific men do not look upon Brice's pretensions at all seriously. The scheme may work to float stock companies and to bleed the unwary, but the bubble is easily burst. The best, and generally the surest, way to get gold is to earn it.

The National Pure Food Bill.

The pure food and drug bill, as amended by the Pure Food Congress at Washington and published in the Era last week, is attracting considerable favorable comment. While not perfect, it is not, in our humble opinion, calculated to work any very great or undeserved injury to the interests of any right-minded and honest-intentioned manufacturer or dealer, while at the same time it is strong enough to punish the willful adulterator, substituter and false brander of foods and drugs.

There seems to arise opposition against any attempted

pure food legislation, opposition from quarters least expected, from those whose motives and honesty cannot be questioned, whose opposition cannot be explained on any reasonable basis. Thus, it is difficult to explain why it is, if correctly reported, that the drug trade section of the New York Board of Trade and Transportation is preparing to fight this bill tooth and nail. One of its members is quoted as saying, "We don't want any pure food and drug laws at all."

Surely it is right that the people should be protected against adulterated, fraudulent and deleterious foods, and if law is necessary to thus protect them, then we should have the law. The drug trade should be found always upholding, not opposing, honest efforts at such protection. The bill now under discussion is such an honest attempt, and it does not contain the feature so objectionable in similar previous measures, that the formulas for proprietary articles are to be disclosed, save such as can be proven frauds and dangerous.

The work of the congress, even if it fail to pass the bill, should be productive of substantial advances in the direction of the aims to which it is directed. It requires no exhaustive study of the subject to discover that the remedy, in so far as there is any practical remedy, is either through Federal legislation or uniformity of State laws on the subject. It is well nigh impossible to prevent the use of a specified product in any particular State if its importation cannot be barred from States which permit its manufacture and use. Moreover, if this importation cannot be prevented, it is unfair for a State to bar its own citizens from carrying on themselves the manufacture or compounding of the products in question. The desirability of uniformity of State laws or of a general Federal law on the subject is therefore apparent enough. Neither is likely to be accomplished without much patient effort. The drug trade should do all it can to assist.

We are not in favor of every feature of the bill, but as a whole it is far better than none, and we approve of it.

Formaldehyde is enthusiastically spoken of by some of its advocates as a probable means for the protection and preservation of foods, especially meats. Experiments are cited wherein the bodies of turkeys and smaller birds, dressed, were subjected to the action of formaldehyde vapor for a short time and then wrapped in cloths saturated with a 40 per cent. solution of formaldehyde diluted with glycerin. After some days or weeks the wrappings were removed, the birds exposed to the air for a little period, and then roasted, the result being that the meat was as sweet and palatable as if freshly killed, and all traces of formaldehyde, detectable by either odor or taste, were completely dissipated. If further and more extended experiments are equally satisfactory, a new and important field of usefulness is opened for this very efficient antiseptic, disinfectant and deodorant.

The Maryland Legislature is to be asked to wrestle with a bill which will prohibit the use of bottles, boxes or packages which once contained drugs or medicines, for the same purpose a second time. The object of the bill is alleged to be to break up the practice of druggists buying second-hand bottles, upon the ground that the use of such bottles is dangerous to health, because they are often not properly cleaned. Very few, if any, druggists do this sort of thing. It is a poor druggist indeed who has not his own name-blown-in-the-glass bottles. Ask the boys who, depending on the hoary myth that the druggist is a liberal purchaser of old bottles, industriously collect a large stock for sale to him, what success they have. Bitter disappointment, the rude shattering of a fondly cherished delusion.

Spokane, Wash., is in the throes of a cut-rate drug war. Same old story. Cut-rate store opened, druggists tried to close it up by cutting deep in retaliation, no suc-

cess, now all cut, no prospect of peace and no hope for restoration of prices. Foolish!

The Maryland Senate has passed the bill for a general pharmacy law of the State, but not before one of the Senators had succeeded in exempting one certain county from its provisions, since he contended that there was but one drug store in that county, that there was no necessity for it there and that it was not wanted by his constituents. Rather peculiar legislation, but one never knows what will happen to pharmacy bills after they have left their framers' hands.

A druggist in Buffalo, N. D., some time ago was caught selling liquor illegally, and an injunction order of the court was served upon him. He has just been found guilty of violating this order, and has received the severest sentence ever imposed in the State for a similar offense. He was sentenced to pay a fine of \$800, with costs of trial, to serve ninety days in jail, and have his druggist's license revoked for five years.

Some candy chickens sold in the neighborhood of Pittsburgh, to children, have been found to contain 20 per cent. of plaster of paris and the balance glucose. A nasty mixture to put in the little ones' insides. The illness caused to several children by this candy directed attention to it and its iniquitous nature was soon disclosed. There is trouble brewing for its manufacturers.

"Druggists and gamblers on the anxious seat," is the way they print it in certain Western papers, in referring to the fact that in North Dakota the Grand Jury has been called to investigate alleged violations of the State Prohibitory law. This coupling druggists with gamblers in law breaking is not very complimentary to the former. We hope they do not deserve it.

Denver druggists have been assessed \$5 each on account of the suit in the courts to test the validity of the ordinance regulating the sale of liquor in drug stores. Word was also sent out to the effect that a blacklist has been declared on eight wholesale druggists for selling wares to department and cut-rate stores.

A couple of burglars broke into a church in a New York town and drank all the communion wine. They were found dead drunk and were locked up. A good argument for the use of an unfermented sacramental wine, but, come to think of it, in that case the robbers would not have been caught.

IDENTITY REACTION OF QUINIDINE.—It is readily ascertained by characteristic reactions whether one of the four principal cinchona alkaloids, quinine, quinidine, cinchonine and cinchonidine, belongs to group I.—quinine, quinidine, or group II.—cinchonine, cinchonidine, but it is much more difficult to distinguish between the individual alkaloids of each group. When only small quantities are available for examination, which frequently happens, it is hardly possible to distinguish quinine from quinidine, as the melting points of the dry bases differ by only 1.3° C. and the reduction and oxidation reactions are nearly alike with each. Such reactions as distinguish them with certainty, solubility and optical rotatory power, require considerable quantities of material. S. Vreden (Ann. de Ph.) believes to have found in Marmé's reagent (cadmium potassium iodide) a ready and excellent means of identifying quinidine and proceeds as follows: A minute quantity of quinidine, about the weight of a flaxseed, is dissolved in 5 cc. of water faintly acidulated with sulphuric acid. On adding Marmé's reagent to this solution and shaking a moment, a flocculent precipitate appears, which after a few minutes changes to a mass of fine needles in bunches, visible under the microscope, but appearing amorphous to the naked eye. After a certain time, broader and larger crystals also appear. Quinine, cinchonine and cinchonidine, when treated in this manner, also give crystals, but they differ from those of quinidine in appearance. The crystals obtained with quinidine are always the same in form. The reaction is useless in cases of mixtures of alkaloids. (Ap. Ztg.).

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

GIVE THE DEVIL HIS DUES.

New York, March 14.

To the Editor:

In the Era of March 10th a number of opinions on the Phenacetine case are cited, all of which severely attack the patent rights upon this remedy. Since this is also a moral attack on the results of scientific work in general, it deserves consideration from another standpoint.

No one except those who have engaged in organic synthetic work can ever appreciate the discouragements and difficulties encountered in work of this character. It requires an expensive and careful education, the part of the chemist, who may labor for years, making perhaps new discoveries, none of which, however, will bring him anything more than a notice in the chemical journals. This gives him no income; should he be fortunate enough to produce a substance of medicinal value, would anyone for a moment deny him his right to procure a patent in order that he may secure for himself some remuneration? Certainly not. No one with a well balanced mind will deny that the product of brain work has rights to protection and remuneration. The same is equally true when applied to a company employing a hundred or more such investigators, who, after years of labor, turn out probably a thousand synthetic products, yet among this number scarcely one or two ever prove to be of any medicinal value. Such a promising future requires an unlimited amount of capital and energy to introduce, when we consider the crowded condition of the market, nor can we with justice so severely criticize the manufacturer for protecting himself for the limited time of a patent? He is certainly entitled to some rights.

As cited in the same article, phenacetine is compared to morphine and quinine; these, it is stated, differ from the former only in degree. Alkaloids cannot be placed in the same category with the pure synthetic products, for they are natural products stored up in the plant kingdom, requiring no further skill for isolation than that involved in their extraction and purification. In this criticism dermatol is cited. Here we have a well known compound of gallic acid and bismut which anyone is privileged to prepare and sell except under the above name. No one objects to the copyright granted on a preparation of scale pepsin sold under a special title; it does not prevent anyone else from preparing the same. The terms copyright and patented are badly confused by the writers. Phenacetine is a patented product, the process of manufacture is open to all, and all the inventor desires, like every patentee, is protection. What incentive is there then to the modern chemist if the results of his labor are to be given free to the public? Who will volunteer to provide for him or his family? If all of our patented synthetic remedies were thrown open to the market, the pharmacist would not make a cent more profit than now. I doubt if as much. We must be consistent in this matter, as we are not dealing with patent proprietaries. X

MILK AND BUTTER BACTERIA.—Lord Lister and Pasteur many years ago showed that the souring of milk and cream is due to a process of fermentation during which the milk sugar is converted into lactic acid, and that this is due to the activity of minute microorganisms. It remained for Prof. Wilhelm Storch, of Copenhagen, however, to introduce the use of pure cultures of milk-souring bacteria in butter-making. Storch found that several kinds of acid-producing bacteria are concerned in the normal souring of cream, and he isolated three species that imparted especially fine flavors to butter. Other workers in this subject have been Professor Weigmann, of Kiel, in Germany, and Prof. H. W. Conn, of Wesleyan University. Now S. C. Keith announces in the Chemical News his discovery of a new flavor-producing bacterium which he calls *Micrococcus butyri-aroma-faciens*. It is a micrococcus growing at 37° to 20° C. It liquefies gelatin slowly, but does not grow well on potato. (Pop. Sci. Monthly.)

[The process is patented also.—Ed.]

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Ellas H. Bartley, B.S., M.D., Ph.G.
Virgil Coblentz, A.M., Ph.M., Ph.D., F.C.S.
Wilber G. Compher, A.M., M.D.
Albert E. Ebert, Ph.M., Ph.D.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.
Charles F. Heebner, Ph.M.B., Ph.G.
George B. Kanfman, B.Sc., Ph.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G.
Edward Kremers, Ph.G., Ph.D.

John Uri Lloyd, Ph.M., Ph.D.
Oscar Oldberg, Ph.D.
Charles W. Parsons, Ph.C.
Edgar L. Patch, Ph.G.
George F. Payne, Ph.G., M.D.
T. D. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M., M.D.
Henry H. Rusby, M.D.
L. E. Sayre, B.S., Ph.M.
Wilbur L. Scoville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Jullus W. Sturmer, Ph.G.
Frederick J. Wullig, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 53.

Inorganic Chemistry.

The Alkali Metals (Continued).

POTASSIUM.

Symbol K. Valence 1. Atomic Weight 39.04. Specific Gravity 0.875.

Historical.—Like sodium, certain compounds of potassium have been known since immemorial times, but until near the middle of the last century the compounds of both metals were confounded. In 1759 Marggraf called attention to the fact that one kind of alkali colored the flame of the spirit lamp yellow, while the other colored it violet. The free element was first obtained by Davy in 1807, by the electrolysis of the hydroxid.

The name potassium is from potash, the English name of the crude alkali obtained by evaporating the lye of wood ashes in iron pots. The symbol comes from Kali, the German name for the same substance.

Natural Occurrence.—Compounds of potassium are found in many crystalline rocks and in all soils. It is an essential constituent of plant tissues, and vegetable life cannot be maintained in the absence of its compounds. It is also a constant and important constituent of the animal body. While sodium compounds are most abundant in sea plants, those of potassium predominate in land vegetation.

Preparation.—Potassium can be prepared by the electrolysis of its chlorid or hydroxid or by decomposing the carbonate by red hot carbon, in the same manner as sodium is obtained.

Description and Physical Properties.—At common temperatures potassium is solid, of a wax-like consistence, and showing a brilliant silvery white luster on a freshly cut surface, quickly tarnishing from the formation of oxid.

It melts at 62.5° C. to a mercury-like liquid, and boils at a red heat, forming a green colored vapor. It is lighter than any other metal except lithium.

Chemical Properties.—It oxidizes rapidly in moist air, and decomposes water with violence, to form the oxid, which then dissolves in the water. The heat of the reaction is sufficient to ignite the evolved hydrogen, the flame being colored violet by the potassium. The metal exhibits even greater affinity for oxygen and other negative elements

than sodium, and, like the latter, must be preserved in some oxygen-free liquid, as naphtha or petroleum.

COMPOUNDS.

Like the preceding element, potassium forms a monoxid, K_2O , and a dioxid, K_2O_2 , both soluble in water, the first forming a hydroxid, KOH, commonly known as caustic potash. All of these substances absorb moisture readily and deliquesce, and hence are valuable as dehydrating agents in the drying of gases. They likewise readily absorb carbon dioxide from the air to form the carbonate. In general, the compounds of potassium bear a very close resemblance to the corresponding compounds of sodium, and may usually be substituted for them in experimental work.

In addition to those already named, other compounds of importance are the iodid, bromid, carbonate, nitrate, permanganate and chlorate. Except the carbonate, the properties of these salts depend principally upon the negative elements and acid radicals, and hence are most conveniently studied under the heads of the latter. Many of them are of great importance in medicine and the arts. The iodid is largely used as an alterative, the bromid as a hypnotic and sedative.

As might be expected from the large amounts of oxygen in their radicals the nitrate, permanganate and chlorate are powerful oxidizing agents, and in mixtures with organic or oxidizable substances may explode with violence. The nitrate, or saltpeter, is the oxygen-yielding constituent of gun powder, while the permanganate is a powerful oxidizing agent and disinfectant. The chlorate is much used in medicine, and when triturated with organic or combustible matter may explode.

Characteristic Reactions.—The most characteristic reaction of the potassium salts is the beautiful lavender or pale violet color which they impart to the non-luminous flame. This color is obscured by the yellow flame of sodium, but not by blue glass, which fact permits potassium to be detected in the presence of sodium.

The visible spectrum of potassium consists of one red

and one violet line. There are other lines, but they are somewhat indistinct.

Owing to the sparing solubility of the acid tartrate of potassium, a white crystalline precipitate of that salt is produced when a concentrated solution of tartaric acid is added in excess to a solution of a potassium compound. With platinum chlorid potassium salts form a yellow crystalline precipitate of the double chlorid of potassium and platinum.

RUBIDIUM AND CAESIUM.

Symbol.	Valence.	Atomic Weight.	Specific Gravity.
Rb.	1.	85.2	1.52
Cs.	1.	132.7	1.88

Historical.—Both elements were discovered by Bunsen by means of spectrum analysis, Caesium in 1860, and Rubidium in 1861.

The name rubidium is from Rubidus, dark red, in allusion to the characteristic color of its spectrum, and caesium from Caesius, sky-blue, from the deep blue lines of its spectrum.

Natural Occurrence.—Both elements occur widely distributed in minerals, mineral waters and the soil, and rubidium in the ashes of plants, but in exceedingly minute quantities. In the case of rubidium it was necessary to evaporate 40 tons of the mineral water in which its salts occurred in order to procure sufficient material for a study of the properties of the element.

Preparation.—Rubidium may be obtained in the metallic state in the same manner as potassium, by heating the carbonate in contact with carbon, and condensing the volatilized metal. Caesium has been prepared by the electrolysis of the cyanid, and by fusing the hydroxid with metallic aluminium.

Description and Physical Properties.—Both elements are soft, silver white metals. Rubidium has a specific gravity of 1.52, and fuses at 38.5° C. The specific gravity of caesium is 1.88, and its melting point 26.5° C.

Chemical Properties.—Rubidium and caesium are the most electropositive elements known. Owing to their intense affinity for oxygen they inflame spontaneously when brought into the air, and decompose water with explosive violence.

COMPOUNDS.

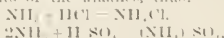
So far as they have been prepared and studied their salts bear a very close resemblance to those of potassium. Physiologically they are more active.

Characteristic Reactions.—Both elements exhibit such a close resemblance to potassium and to each other that it is only by means of the spectroscopic that they can be discriminated with certainty. The color which rubidium salts impart to the non-luminous flame is more reddish than that caused by potassium. Its spectrum consists of two lines in the violet and two in the red. The reaction is so delicate that 0.002 mgrm can be detected. The flame of caesium is still redder than that of rubidium. Its spectrum consists of two characteristic lines in the blue.

AMMONIUM.

Formula NH_4 . Valence I. Molecular Weight 18.

The formation of the Ammonium compounds has been described under Nitrogen, and the subject is referred to here simply to call attention to their close resemblance to the compounds of the alkali metals. The radical NH_4 has never been isolated, since whenever it is released from its compounds it immediately decomposes, with evolution of ammonia, NH_3 . The latter compound unites with acids without displacement of the hydrogen of the latter, the resulting salt resembling the corresponding salts of the alkalis, thus:



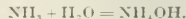
When a solution of ammonium chlorid is mixed with an amalgam of mercury and sodium, the mass increases greatly in volume, and becomes of a buttery consistence. This so-called "ammonium amalgam" quickly decomposes, releasing ammonia gas.

Ammonia is produced as the result of the decomposi-

tion of organic matter containing nitrogen, and hence its odor is always noticeable where urine or heaps of manure are permitted to decompose spontaneously. Ammonia is also produced by the destructive distillation of coal in the manufacture of illuminating gas, and it is from this source that the bulk of the ammonium compounds of commerce is obtained.

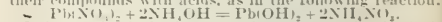
At ordinary temperatures ammonia is a colorless gas, of a very pungent odor, irrespirable, and having a strongly alkaline reaction. At a pressure of seven atmospheres it is reduced to a colorless liquid. Owing to the fact that it may so easily be reduced to the liquid state by pressure alone it is employed largely in the manufacture of artificial ice. By means of powerful pumps it is placed in tanks corresponding tanks in which water is liquified. On removal of the pressure the liquified ammonia returns to the gaseous state, and in so doing absorbs so much heat that the water in the tanks is frozen.

Ammonia gas is very soluble in water. At ordinary temperatures water absorbs about 700 times its volume of the gas, and at 0° C. about 1,000 times its volume. When the gas dissolves in water it is thought to combine with the water molecule to form the hydroxid, thus:—



An aqueous solution containing 10 per cent. by weight of the gas constitutes the Aqua Ammoniae of the Pharmacopoeia.

Ammonia is a strong base, and is capable of displacing many of the metals and most organic bases from their compounds with acids, as in the following reaction:



It is inferior in basic power, however, to the fixed alkalies, and is driven out of its combinations by the latter.



Besides its aqueous solutions the most important ammonium compounds are the chlorid, sulfate, oxalate, carbonate and sulfid. Except when combined with very weak acids, as carbonic, the salts of ammonia are odorless.

Characteristic Reactions.—Free ammonia, NH_3 , is known by its pungent odor, by its forming a white cloud of ammonium chlorid when approached by a glass rod moistened with hydrochloric acid, and by its turning moistened red litmus paper to blue. Only free ammonia gives these reactions, hence ammonium salts must first be treated with a fixed alkali, as potassium hydroxid.

Ammonium compounds are precipitated yellowish to reddish brown by Nessler's solution (alkaline potassium-mercuric iodid) even in exceedingly dilute solutions.

PRACTICAL STUDIES.

1. Make a loop on platinum wire, and clean with hydrochloric acid, as described under lithium and sodium. When the wire has been cleaned, dip it into a solution of potassium chlorid, or other potassium compound, acidulated with hydrochloric acid, and hold in the edge of a non-luminous flame. Repeat the operation a number of times until the appearance of the flame becomes familiar. Next interpose a piece of blue glass between the eye and the flame, and repeat the experiment. Can the color of the potassium flame be perceived through the blue glass? Compare with the corresponding experiment under sodium.

2. Mix with the potassium solution some salt of sodium and repeat the preceding experiment. Is the potassium flame visible in the presence of sodium? Is it visible when the blue glass is used?

3. Add some ammonium salt of tartaric acid to a concentrated solution of potassium acetate, and observe whether a precipitate is produced. If it does not appear in a short time, add some alcohol and permit the mixture to stand for some hours. What is the probable composition of the precipitate? Balance the equation, $\text{K}_2\text{C}_4\text{H}_4\text{O}_6 + \text{H}_2\text{C}_4\text{H}_4\text{O}_6 = \text{KHC}_4\text{H}_4\text{O}_6 + \text{H}_2\text{C}_4\text{H}_4\text{O}_6$.

4. Fill a wide-mouthed glass jar or bottle one-fourth full of water. Weigh a piece of metallic potassium the size of a small pea, free from petroleum and drop it upon the water, holding a piece of glass a short distance above the mouth of the jar to protect the face. Describe what takes place. What is the probable composition of the white cloud which fills the jar? Does the water dissolve anything? Test it with a piece of red litmus paper.

5. Place some ammonium chlorid solution in a test tube, and note whether it possesses odor. Add some solution of sodium or potassium hydroxid, heat and again examine for the odor. Moisten a piece of red litmus paper and hold in the mouth of the tube. How is it affected? Next a glass rod or stonewort with hydrochloric acid and hold over the test tube. What occurs? What is the composition of the product?

Write equations showing the reaction of potassium hydroxid on ammonium chlorid, and of a hydrochloric acid on ammonia.

LECTURE NO. 54.

Pharmaceutical Microscopy.

ACCESSORIES.

In addition to the mechanical and optical parts already described, there are numerous other attachments, both mechanical and optical which are either indispensable to the performance of satisfactory work with the microscope or may be used with great advantage therewith, and which are comprehended under the general term of accessories.

The Object Holder.—In the case of opaque objects it is only necessary to place them under the objective, illuminate their upper surface in some convenient way and examine them by means of the light which they reflect into the objective.

In the larger proportion of cases, however, the objects to be examined are transparent, and are studied by means of the light transmitted through them from below. This manner of viewing them renders necessary the employment of some transparent object holder, and for this purpose there are commonly employed pieces of glass, known as Slips. These should be of clear glass, 25 x 75 mm (1 x 3 in.) in size, with smoothly ground edges, to prevent their scratching the surface of the stage when moved about over the latter.

The Cover Glass and its Use.—The object to be examined, e. g., a vegetable powder, having been deposited upon the middle of a slip, is usually covered with a drop of some transparent liquid, as water or Canada Balsam, which, being absorbed by the powder, renders the latter permeable to light. Since a drop of liquid always presents a curved surface, it will act like a lens and magnify or distort the image. This is prevented by the use of a very thin piece of glass, known as a Cover Glass, which being pressed down upon the drop of liquid not only destroys its curved surface, but helps to flatten the object as well.

The use of the cover glass, while it removes the disturbing effect of the curvature of the liquid, introduces another disturbance due to the difference in its refractive powers from the liquid beneath and the air above it. The rays of light from the object on leaving the liquid for the denser cover glass are first refracted toward a perpendicular to the latter. Upon emerging into the less dense air they are again refracted, but in the opposite direction. The result of these two refractions is a displacement of the rays so that they seem to come from other than their true sources, and the greater the thickness of the cover glass, the greater will be the displacement. Since the amount of displacement is magnified by the microscope it is evident that a more or less blurred and distorted image must result.

Two ways of curing this defect exist, either by an adjustment of the lenses of the objective or by altering the tube length.

Adjustable and Non-Adjustable Objectives.—If cover glasses were always of one thickness it would be possible for the manufacturer to avoid the blurring of the image mentioned above by a suitable adjustment of the lenses of his objectives before they left the factory. Unfortunately cover glasses vary greatly in thickness, and this given rise to the manufacture of Adjustable Objectives or Objectives with a collar attachment which by turning to the right or left causes the front and back combinations to approach or recede from each other until the disturbance caused by a too thick or too thin cover is removed.

Other objectives are made to be used for a particular thickness of cover glass, and are hence known as non-adjustable objectives. With such an objective it is necessary to always select cover glasses of the proper thickness or else modify the length of the draw-tube until the image appears with satisfactory clearness.

For determining the thickness of cover glasses a cover glass gauge is used, one form of which is shown in the illustration. (Fig. 20.) The cover glass having been placed in the central depression, the spindle projecting at the right is turned until the cover glass is held firmly by the two projecting points seen in the central depression. The index on the drum then gives the proper tube length for that thickness of cover.

When no means of measuring the cover glass is at hand the remedy is to first focus the object as sharply as possible, and then gradually alter the tube length until the greatest distinctness is obtained. The tube is lengthened for cover glasses thinner than the standard, and shortened for thicker ones.

Multiple Nose Piece.—It will be remembered that the nose piece is the milled ring on the lower end of the body into which the objective screws. With this simple form

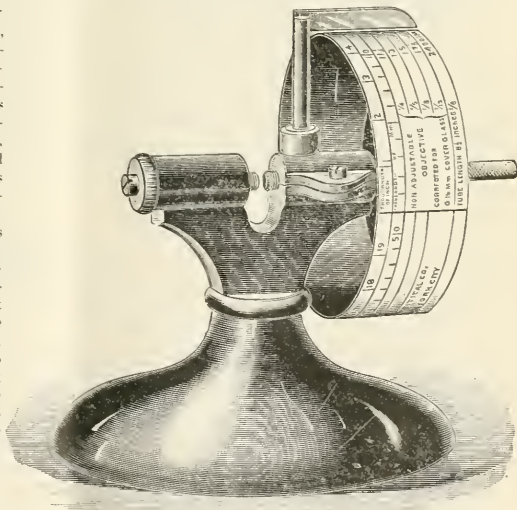


Fig. 20.—Cover Glass Gauge.

of nose piece, when it is desired to use an objective of higher or lower power than the one attached, the latter must be unscrewed and another screwed on, an operation requiring considerable time. This necessity is obviated by the use of the multiple nose piece, the most common and useful of which are the double and triple. (Figs. 21 and 22.) In this the objectives are screwed into a revolving frame attached to the body, and whenever a change of power is desired it is only necessary to revolve the frame until the desired objective is brought into place, the exact adjustment usually being indicated by the click of the spring which holds the objective in its proper position.

Condensing Lens or Bull's-Eye Condenser.—When the light reflected from an opaque object is insufficient to show its surface clearly, or when the mirror does not afford sufficient illumination for that purpose, it is convenient to have a plano-convex lens mounted in an adjustable holder, by means of which a powerful beam of light

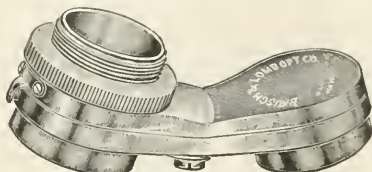


Fig. 21.—Double Nose-Piece.

can be directed upon the object. (Fig. 23.)

Substage.—In the better class of instruments some method is usually provided beneath the stage for the support of illuminating apparatus. The simplest form of this



Fig. 22.—Triple Nose-Piece.

attachment is a plain ring of brass, known as a substage ring, which screws into the well hole and serves as a support for various accessories used beneath the stage. The more elaborate and costly mechanical substages are arranged so that they can be elevated and depressed, or swung aside at will, and to support condensing lenses, polarizing apparatus, mechanical diaphragm, and other accessories. (Figs. 24 and 25.)

The Substage Condenser.—In the use of high power objectives, and especially in bacteriological work, it is important to possess some means of increasing the intensity of the light transmitted by the object to the objective. This is best accomplished by means of the Abbe Substage Condenser (Fig. 26), a combination of two or more convex lenses which, by means of the substage or substage ring, can be brought close to the under side of the slide and thus converge a strong beam of light upon the object. The Abbe condenser is, in effect, a short, wide objective, used in an inverted position. Like other objectives it must be focused, or, after having been placed in position, moved slowly up and down until the best results are obtained.

Its structure is sufficiently indicated by the illustration.

The Iris Diaphragm.—Some form of diaphragm or means of increasing and decreasing the aperture in the stage is always supplied with the stand, but the most convenient apparatus of this sort, and the one best adapted for use with the Abbe condenser is known as the Iris Diaphragm. (Fig. 27.) This consists of a ring-like frame, containing a series of radiating steel plates, which by means of a lever or milled collar can be caused to open or close in a manner resembling the enlargement and contraction of the pupil of the eye, whence the name of iris diaphragm. When used with the Abbe condenser it is always placed beneath the latter, and can be operated so as to regulate the amount of light admitted, from the full diameter of the condenser down to that of a pin hole.

The Micrometer.—It is frequently necessary to be able to

estimate the size of objects examined under the microscope, and this is accomplished by means of the Micrometer. The Stage Micrometer is an ordinary glass slip upon which a scale consisting of fine lines has been ruled. The object to be measured, say a grain of starch, having been placed upon the scale it is only necessary to observe through the microscope how many lines it covers, when its dimensions will be known. Measurements made by this method are liable to inaccuracy, owing to the fact that it is a difficult matter to make the object coincide with the ruled lines. For this reason it is generally more convenient to use the Eye Piece Micrometer, consisting of a ruled piece of glass which can be inserted between the first and second lenses of the ocular. The advantage of this method of mounting is that the eye piece can be rotated, or the slide having the object moved about, until the lines of the micrometer are made to exactly coincide with the image of the object to be measured.

As the eye piece micrometer does not measure the object directly, but only its image as magnified by the objective, it is necessary to compare the eye piece micrometer with a stage micrometer, using the same objective, eye piece and tube length, as when the object was examined.

Micrometers may be ruled in fractions of the inch or in fractions of the millimeter. A unit commonly employed for micro-measurements is the micromillimeter, or the thousandth of a millimeter (.001 mm) generally represented by the Greek letter μ .

The Microscope Lamp.—Where the microscope is used after night some artificial method of illumination is necessary. For this purpose we may employ any source of light which is regular in character, as the incandescent electric lamp, the Welsbach gas burner, or the ordinary petroleum lamp using a flat wick.

Whatever source of light is used it should not be of a flickering nature, and the rays should be directed directly upon the mirror, the top of the stage and the eyes of the operator being protected by a shade.

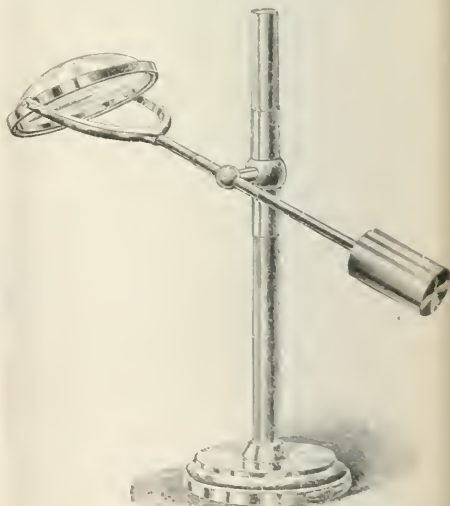


Fig. 23.—Bull's Eye Condenser.

When the petroleum lamp is employed, the narrow edge of the flame should be used as the source of light.

A convenient oil lamp is the Acme, shown in the illustration. (Fig. 28), which can be clamped at any height.

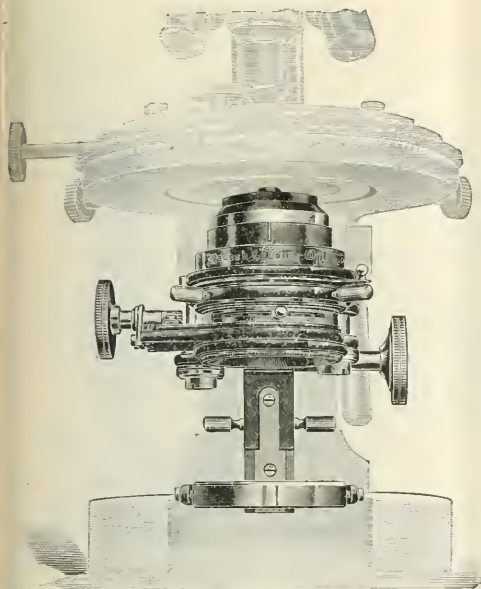


Fig. 24.—Complete Sub-Stage.

and also has a lens let into the side of the shade for the purpose of directing the beam of light upon the mirror.

Another form of microscope lamp is that illustrated in Fig. 29, in which the burner is surrounded by an opaque iron chimney, through the side of which project two glass rods, curved toward the ends. The light from the flame is transmitted through the rods and emerges through the ends which are brought beneath the stage, or directed upon the object from above when opaque bodies are examined. As far as the experience of the writer goes, this form of lamp has but little if any advantage over the ordinary lamp with a flat wick.

The student can easily prepare a very satisfactory lamp from the small glass lamps with handles, and having the round or "sun" burner and chimney. The inside of the chimney being thoroughly smoked, so as to be quite opaque, the finger is inserted and the soot rubbed off in a clear streak where the light is desired to escape. Or the chimney can be completely covered with one or two layers of tin foil, and a narrow slit or window cut in the foil to permit the emission of the light.

The Camera Lucida is an apparatus used by the microscopist to enable him to draw accurately the images of objects examined under the microscope. The principle of its operation is that it causes widely separated objects to appear together in one field of view. Thus when the camera is in position and

correctly adjusted, the observer at the eye piece will see the image apparently projected upon the white surface of the paper upon which it is to be drawn.

Of the numerous forms of camera lucida which have been invented only two need description, the Wollaston and the Abbe.

The Wollaston camera lucida consists of a quadrangular prism contained in a mounting attached to the ocular, and used with the microscope in a horizontal position. (Fig. 30.) The eye is so placed that the rays from the image enter one-half of the pupil, and the rays from the drawing surface through the other half, when the two fields of view apparently coincide.

A more complex, but more efficient, apparatus is the Abbe camera lucida, which is commonly used with the microscope in an upright position. (Fig. 31.) This consists of a cube of glass cut into two triangular prisms, and the inclined surface of the prisms silvered, except for an elliptical space in the center, and the two prisms cemented together again. This is fastened in a mounting above the ocular in such a position that a free and equally illuminated view of the field of the microscope is afforded through the unsilvered opening in the prism. From the side of the mounting extends a bar which supports a movable mirror which reflects an image of the drawing paper and the pencil point into the upper prism, whence it is reflected by the silvered surface to the eye, seemingly coinciding with the field of the microscope as seen through the opening in the silvered surface of the prism.

The two fields should be equally illuminated, otherwise objects in the one least illuminated will seem faint and indistinct. If the image in the microscope is too bright it may be toned down, either by narrowing the aperture in the diaphragm, or by placing a piece of white paper over the mirror. When the image of the drawing

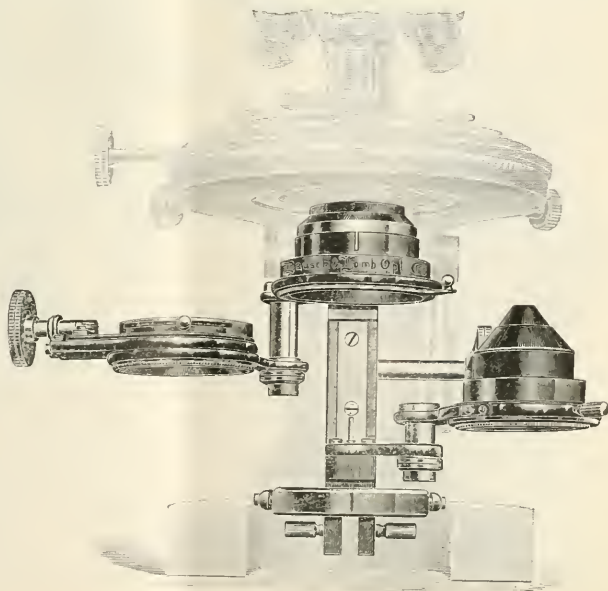


Fig. 25.—Sub-Stage, Showing Condenser and Iris Diaphragm.

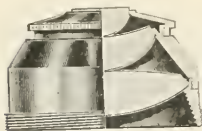


Fig. 26.—Abbe Condenser.

manufactured by Bausch and Lomb there is supplied a compensation prism, comprised of two wedges, one of smoked and one of clear glass. By a careful adjustment of this prism a point may be found where the image of the object and the drawing surface are of equal brightness.

In order that there be no distortion in the drawing it is essential that the axial ray from the image in the microscope should after reflection strike the drawing surface exactly at a right angle. This will be the case when the reflecting mirror is inclined exactly 45 degrees. When inclined at less than this angle, the drawing board should be raised twice as many degrees toward the microscope as the mirror is depressed below 45 degrees. (Fig. 32.)

THE PRACTICE OF PHARMACY IN RUSSIA *

By PROSPER H. MARSDEN, F.C.S.

In the earliest recorded days of the vast country which is now Russia, the healing art was in the hands of wizards and wolfmen, sorcerers and seers, who were at once physicians, surgeons, prophets and historians, who transmitted the traditions of their race from generation to generation.

Of the Scythians, who inhabited the country at the period of which I am speaking, very little is known. At the famous museum in St. Petersburg, "The Hermitage," there is a valuable collection of relics of the Scythian days.



Fig. 27.—Iris Diaphragm.

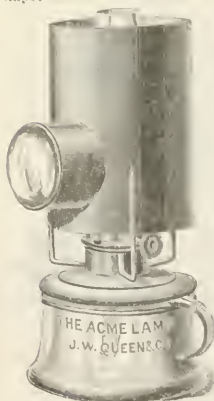


Fig. 28.—Acme Microscope Lamp.

One of the most remarkable examples of the artistic talent displayed at that date is a vase of electrum, most probably of Greek manufacture, or repousse work. It depicts a Scythian battlefield; on one side we see a chieftain consulting a wolfman, another of these surgeons examining a man's jaw for loose teeth or broken bones, and a third bandaging a limb, much as it is done at the present time. This vase is supposed to date from 100 to 250 B. C.

Very little is known of medicine between this time and some 1,200 years later, when Rurik, the Swedish Viking, and his

surface is too brilliant, it should be shaded by interposing a screen between it and the source of light.

With the Abbe camera lucida as

two brothers settled in Novgorod in 862. About this time Christianity was introduced into Russia from Byzantium, and with Christianity came the first knowledge of the arts and of medicine. The famous monastery of Kiev was the earliest seat of learning, and its monks soon became noted for their successful treatment of disease. The wizards and wolfmen disappeared, and

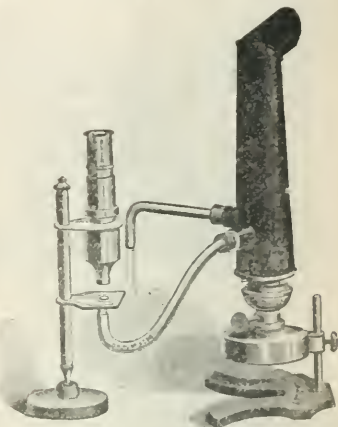


Fig. 29.—Microscope Lamp With Glass Rods.

medical practice was confined to the monks till the eleventh century, when certain Armenians appear to have set up in opposition to them. During the next 250 years the Tartars conquered the country, putting very many of its inhabitants to death, but sparing the monks on account of their value as medicine men.

Towards the end of the fifteenth century many foreigners had found their way into the country, and amongst them physicians whose lives do not appear to have been exactly happy, and it is recorded that in 1491 a Jewish physician was executed for failing to save the life of the Czar's son, who was suffering from gonorrhea. The first English medical man to practice in Russia was a Dr. Ralph Standish, who sailed in 1557 to the country with the famous traveler, Anthony Jenkinson, arriving at Astrakhan in 1558. The account of



Fig. 30.—Watson's Compound.

the death of Ivan the Terrible by the Englishman, Henry Say, who was at that time the ambassador to the Russian capital, is of some interest as containing the earliest English mention of pharmacy in the country. It was during the reign of Ivan the Terrible that the Ministry of Medicine was inaugurated, and under the auspices of this government the first apothecary pharmacy was opened in 1581. This apothecary was at first merely a central store for the distribution of medicine to the court. It was an Englishman who opened the first pharmacy in Russia, and little is known of him beyond the name—James Freuchen. Owing, doubtless, to the oppressive treatment he received at the hands of the Russian Freuchen, soon after founding the first apothecary, he appears to have left Moscow and returned to his own country. An extensive correspondence took place between the Tsar and our Queen Elizabeth, in consequence of which Freuchen was induced to return to Russia some

* Abstract of a paper read before the Liverpool Chemists' Association, February 10. Reprinted from *Br and Col Drug*

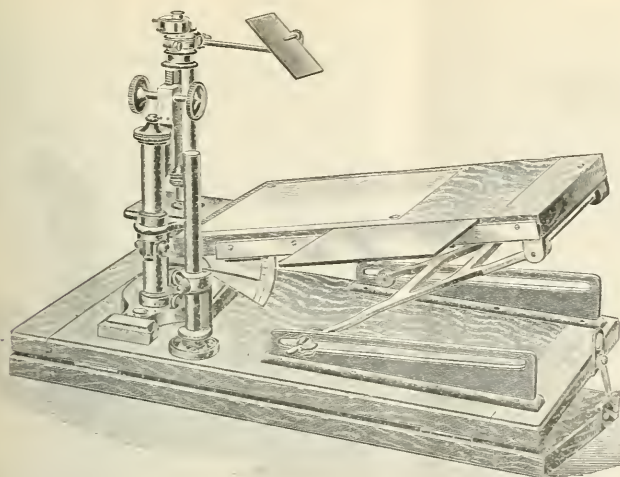


Fig. 32.—Microscope with Abbe Camera Lucida and Adjustable Drawing Table.

twenty years later, together with his wife and family, and a collection of drugs, a list of which, containing the names of no less than one hundred and sixty-four drugs and preparations, is still extant.

In the Ministry of Medicine, to which the apteka was attached, there were several classes. The physicians, surgeons, aptekars or apothecaries connected with the court apteka, and under them alchemists, distillers, pupils and collectors of herbs. Also oculists, barbers, blood-letters, bone-setters and undertakers. The income of the ministry was derived from a government grant.

The old apteka was for the use of the court alone, and very soon a new one was opened which sold drugs and preparations to the army and to private individuals. It also had to care for the public health, by preventing the spread of infectious diseases. The medications for the personal use of the Tsar were kept in a room locked and sealed by the secretary of the ministry, the drugs themselves being in sealed bottles and boxes. Should his majesty require medicine, the physician's prescription was submitted to the ministry, who copied it into their books; it was then presented as an official paper to the Tsar, who gave the order for its preparation.

It was taken to the apteka, and prepared by one of the most trusted dispensers. Now, when all was ready it was tasted by a whole series of official personages—firstly, by the prescribing physician; secondly, by the president of the ministry, and, lastly, by the high court official, who actually took it into the august presence.

Many stories are current concerning these tasters; for instance, we are told that the body physician to the Tsar Alexis, the father of Peter the Great, had to swallow the whole bottle of a mixture intended for the Tsaritsa, as it had caused severe vomiting in the last taster, a high court lady, who had taken the potion up to her majesty.

Not only did the aptekas provide medicines, but in the earlier days they furnished such items as 10 pounds of

good amber to the Patriarch of Moscow for the preparation of the chrism, and in later times they provided aniseed and other aromatic substances for the preparation of the strong spirituous liqueurs, or vodkas, for which Russia is celebrated, and even varnish and paints for the imperial yacht.

In those days polypharmacy was rife in Russia, as in the other countries of Europe. In the medicine chest which accompanied Alexis in one of his journeys to the famous Troitsa Monastery, some 40 miles from Moscow, among the oils, elixirs, essences, syrups, salts, powders and plasters, we find a "Syrup of Colt's Hoofs," a "Spirit of Worms," a "Spirit of Ants," and a "Balsam of Unicorn's Horns." Any one who has dipped into the literature of medicine of this date will remember the fabulous price set upon unicorn's horn. In 1655 three of these valuable articles of the materia medica were offered to the apteka in Moscow for 10,000 roubles (say £6,000 nowadays); ultimately the vendor was offered 5,200 roubles. Another piece of a horn, weighing one-quarter ounce, was sold for 20 sable skins. The horn was probably that of the rhinoceros, and it was taken in a state of powder as a prophylactic and specific for fevers, pestilence and snake bites, and it was said to be

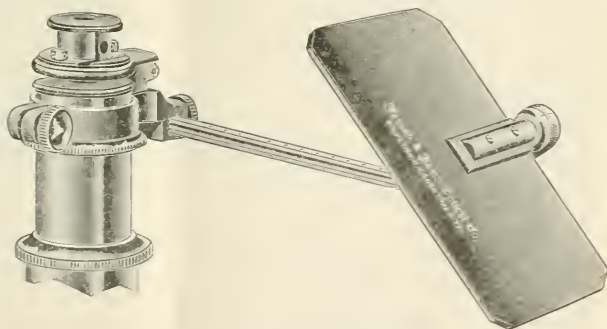


Fig. 31.—Abbe Camera Lucida.

a certain protection against smallpox, dysentery and the plague. Benzoar stones were also in great request. Nearly all the drugs used in Russia at this time came from abroad, Germany, Holland and England, chiefly from the last, the newly opened port of Archangel being the great market for English drugs. Later on efforts were made to collect samples in Russia and Siberia, botanical expeditions were undertaken to distant parts of the empire, and a class of herb collectors sprang up.

Foreign medical men coming into the country brought a large stock of drugs and preparations with them.

Peter the Great conceived the excellent idea of sending his countrymen to foreign universities to study their teaching and methods, much as he himself came to Deptford to study shipbuilding. So much success attended

this movement, that in 1706 the first hospital and school of medicine were opened in Russia under the direction of a Dutchman, Dr. Nicolaus Bidlov, Peter's own body physician. Accommodation was provided for 50 students in this school, and the subjects of anatomy and apothecaries' science were taught, the latter including botany, pharmacognosy, pharmacy and pharmacology, and the London Pharmacopœia appears to have been used.

During the last century universities were inaugurated throughout the empire, and in the nineteenth century there have been four university statutes, placing the curricula and examinations of medical men and pharmacists upon a sound basis.

Russia, so very much behind Western countries in some respects, has the most stringent pharmaceutical regulations of any country in the world.

A candidate desirous to learn "the art and mystery of the apothecary" must be fairly well educated. Boys are accepted from the fifth class in the government school or gymnasium; occasionally they are accepted from the fourth. (In these schools there are eight classes, the eighth being the highest.) He will now be about 17 or 18 years of age, and will serve three years, no premium being received, and a salary is paid at once of about 10 to 18 roubles per month for the first year, rising about 2 roubles each year as a general thing. This is an average estimate, but, of course, the salary is dependent upon the character of the apteka. The apprentice always lives in, and is allowed off duty on alternate Sundays and a few hours on one evening of each week. In the old days the pupils were called "disciples"; they had no salary, but were fed and clothed, and at the end of their time received a complete outfit and a present of some 100 roubles. This is still generally given either at the option of the employer or it may be specially provided for in the indentures. During the three years the apprentice will study the theoretical part of his work, and at the end of the time passes the assistants' examination. After another three years served as an assistant in a pharmacy, which must not be in a village, he may enter for the qualifying examination of Provvisor. This is generally taken about the age of 25 or so, and before entering for the examination he must put in a two and a half years' course of study at a university, this being usually done during the assistantship. One would think that with this lengthy course of study the aptekar would be allowed his freedom from military service; such, however, is not the case, but if he has taken the qualifying examination before being called upon for military service the period of such service is shortened.

The opening of a new apteka is attended with some difficulties. The aptekar must show the local authorities that the population has increased to a certain extent to justify the opening of a new apteka. This is a rule which is pretty general in continental countries, and prevents the overcrowding of towns with shops of one kind which is so noticeable in England. This limiting the number of aptekas has led to much speculation, which the medical department has recently been looking into. This department, which is under the Ministry of the Interior, looks after the welfare of pharmacy, prevents overcrowding (the town of Yaroslavl, once the capital of Russia, has four pharmacies and 30,000 inhabitants), examines periodically the register of prescriptions and fixes a maximum tariff of prices for drugs.

For the highest rank in pharmacy, that of Magister, the candidate is required to have been three years a provvisor, to have passed four years in a university, and to defend a dissertation with at least six theses! The Magister of Pharmacy takes equal rank with M. D. in civil and military practice.

In 1888 women were allowed to enter pharmacy after passing the four lower classes of the gymnasium. After passing through their apprenticeship female candidates

will be allowed to go on to the assistant and provisor examinations. They are not allowed to receive their instruction in a public apteka, but must obtain it privately, and an aptekar taking female apprentices and assistants may not employ male assistants.

The vast apteka of K. J. Ferrein in Moscow may be taken as an ideal Russian pharmacy. There are dispensed here annually 300,000 prescriptions, at a price to customers of about 2s. each. Some 300 men are employed, of whom 123 are qualified. Twenty men are employed in the sale room and 28 provisors in the dispensary. Poisonous drugs are handed to the compounder, and the weights checked by one of two aptekars specially appointed.

The bottles are labeled in Latin, and the poisons are kept in special locked cupboards with glass doors. Things go easily as behooves in a government, and that a Russian government institution. Night duty is taken by assistants in turn. On the mat inside the apteka door sleeps the night porter, and beside him a dog. You ring the bell, he lets you in, and rouses the man on duty, who dispenses your medicine.

I am told that during the recent cholera epidemics medical students were excused half-a-year's time to help cure the patients; in some parts of Russia there was not a single doctor for a district as large as England. One of these men coming to a village saw a patient, and wishing to prescribe for the case, asked the mujik for pen and paper. Neither was to be had in the village, and the woman was dying. The doctor, being a man of some resource, had the door of the izba (hut) taken off, and with a piece of chalk wrote his prescription upon it. The peasant harnessed his telega (cart) and took this most original prescription to the nearest apteka—thirty miles away.

Another story goes on to say that a doctor gave a bottle of medicine to a mujik, whose wife was at death's door, telling the man to "shake her" (bottle being feminine in Russian) before administering. Later on doctor called to see patient; poor woman dead. Asked did she have the medicine? No. Why not? Well—she died. It transpired upon inquiry that the mujik, a powerful fellow, called in an equally able-bodied friend, and they gave the poor patient such a shaking that she died soon after.

I have upon the table types of the labels in common use in Russia; they are of some interest, being quite unlike the adhesive labels in use in most countries. (The labels described were displayed by the lecturer to his audience.)

On sheets 1, 2 and 3 are labels for mixtures, lotions, etc. Upon the front is written the number of the prescription, time of receipt, dispensing, and, when required, the directions to the patient, the prescriber's name, the date, and the price. The ubiquitous eagle, or a picture of the dignified-looking apteka, finishes this side of the label. On the reverse is copied the prescription; and the provisor on duty for the day, who is personally responsible for the correct compounding of the prescription, adds his signature, or rather stamp.

The label is fixed upon the bottle by means of an adhesive label, bearing the words "for internal use," for "external use," as the case may be; or it may be tied on with the bottle cap (Hunt's bottle caps are much used in Russia), and the string sealed upon the narrow end of the label.

Powders, catenches, etc., put up in boxes, have the label shut in with the lid and wrapped round the box. The papers are smaller than those in general use here, and have the name of the aptekar upon the back. It is a common practice to mark prescriptions containing dangerous poisons "Not renewed without the doctor's signature."

Sheet 5 brings us to the painful fact that even in a country so highly advanced in pharmacy as Russia there

exist cutting chemists. Sheet 5 has upon it the announcement that S. Goldberg has taken over the apteka of late R. Keller from the chemico-pharmaceutical laboratory at such and such a place (in the center of Moscow). He sends out foreign patent medicines, disinfectants, etc., at prices of drug stores.

There is also a price current of a Moscow house upon the table from which you will see that the chemist in Russia keeps a large range of general goods besides his drugs. I have now gone through the chief points in the rise of pharmacy in Russia and its conditions. In the Russian Empire there are 6,932 pharmacists, of whom 3,131 are provisors, 2,527 apteka assistants, 1,215 are apprentices and only 59 are magisters.

The conditions of life in an apteka are harder and more abnormal than in this country. Every worker is engaged during 90 to 96 hours per week. If we reckon sleep at eight hours per diem, the Russian pharmacist has for recreation and self improvement 16 hours per week. A signed letter to a first-class Moscow paper, from which the above is quoted, and which is not likely to magnify the case, declares that for 200 years nothing has been done to improve the condition of the aptekar. With his eight or ten years' study he does not appear to be better off than his confrère in England, except as regards social status.

In conclusion, I wish to express my best thanks to my brother, who has been for many years resident in Moscow, and through whose help I have been able to show you the labels upon the table, and to obtain much reliable information upon the subject of Russian pharmacy.

LEAKS, AND HOW TO PREVENT THEM.

By John R. Black, Cripple Creek, Col.

Is everyone connected with your store acquainted with the location of everything in it, from cellar to garret, so there can be no leaks from lost sales, and no duplicating orders for stock on hand? If not, you should keep a stock book, giving the location of everything in your pharmacy. It is not a hard matter to do. You can use three blank-books: One for patent medicines and stock in the front store; one for the prescription department and poison case; and one for the back room and cellar. Name the sections alphabetically, and number the shelves. In case of a call for Jayne's Expectorant, and the new clerk waits upon the customer, he troubles no one, simply looks in the patent medicine book, and finds it listed "C, 3;" for sodium salicylate he looks in the R book, and finds it is "D, 2." When there are calls for obscure remedies, he can tell at once if they are in stock. The plan saves time. Put your stock away by the books.

You lose sales by not keeping reference-books handy. You have calls for herbs. If you do not remember the several names of each, you tell the customer you are just out. With a botanical reference hanging by the herb cans you could have filled the order.

You should have such articles as glycerin, castor oil, arnica, horax, insect powder, etc., put up in suitable packages for your trade; it saves time when your rush comes. I have seen clerks take half an hour during a rush putting up 25 cents' worth of such drugs, other customers leaving the store without being waited upon.

Has it ever occurred to you how many sales are lost every day in your store, and how these losses might have been avoided had you and your clerks been more careful to place upon the order book the stock that was low, and on the list things to be manufactured? When Mrs. Bryan called for a quarter of a pound of compound licorice powder, and you found the bottle empty, she said: "Never mind, I can get it across the street." You thought that it did not amount to much—only a quarter—but if you had been in your neighbor's pharmacy, and heard Mrs. Bryan ask his clerk for the com-

pound licorice powder, and heard the following conversation, you would not have thought so. "Yes, Mrs. Bryan, can I not send it to you?" "Yes, you can, and I wish you would also send me a quart of ammonia, one pound of chloride of lime, a can of Babbitt's potash, two sponges for cleaning, a chamois skin, and a little whiting—we are house-cleaning to-day; there is something more, but I cannot think of it." Looking around she saw the window filled with Best Tonic. "What do you charge for the tonic?" "Two and a half per dozen," handing him a \$10 bill. He handed her the change, \$5.50. "Thank you, Mrs. Bryan, the goods will be at your house within an hour. Good morning." You did not only lose the profit on the \$4.50 sale, but you lost Mrs. Bryan's trade. When she arrived home she found a friend waiting for her, who said: "I am sorry I missed you this morning, I am going down to the drug store." "Oh, are you? Well, go to 'The Pharmacy'; the clerk there sold me a dozen bottles of Best Tonic for \$2.50, and I have been paying the 'Would-be Pharmacy' 25 cents a bottle. They never told me I could save 50 cents by taking a dozen; they are stingy." "All right. I will try 'The Pharmacy,' and see if they treat me as well."

Do you know how many doctors there are in your locality, and how many of them never visit your store? Do you know where Dr. Shortcash's office is, so near by? Many of your customers speak well of him. When Mr. Plentymoney asked your advice about kidney remedy, why did you not tell him kidney troubles are dangerous, and advise him to go for treatment to Dr. Shortcash, who is well informed on kidney disease, in place of selling him a patent remedy for 33 cents' profit, that might make him a lifelong sufferer? When Mr. Plentymoney had taken the contents of several bottles recommended by you, and was about dead, he went to the other druggist, who said to him: "My dear sir, you had better go at once to Dr. Shortcash, who is most successful treating kidney trouble;" and he did, returning in forty minutes with four prescriptions, one calling for eight ounces of liquor potassii citratis; one for a dozen sulphonal powders, 10 grains each; one for two dozen A. S. B. compound pills; and one for a 2-quart fountain syringe. Mr. Plentymoney, paying \$5 for his medicine, said: "I am so glad I went to him. He knows just how I feel, and will watch my case closely. Much obliged to you, sir, for sending me to him." When he had gone but a few minutes, in came the doctor and addressed the druggist thus: "I am obliged for that patient you sent me to-night. I have been sending prescriptions to the 'Would-be Pharmacy' even since I came here over six months ago, and they have not sent me a patient as yet. I will get better acquainted with your store." Can you see the leak?

How many remedies do you make which your customers cannot obtain elsewhere? It is a good advertisement to have your trade say to their friends: "You can find it there. I tried other stores before I went to 'The Pharmacy.' They are alive there; for I was never yet disappointed in getting what I wanted. After trying every drug store in town, looking for Hoodlum's Sarsaparilla, I went there. The clerk said to me: 'Use it for the blood?' I replied: 'Yes, sir,' and he handed me a bottle of their own blood remedy, saying: 'So many of our customers have requested us to put up a remedy we could recommend, that we put this one up. It is a prescription of the renowned Dr. McDade, and is used in all such cases as yours. It comes higher than sarsaparilla; we charge \$2 a bottle for it. From what our customers say, it is worth a dozen sarsaparillas. If you require much of it, I will sell you half a dozen bottles for the price of five. You can take one now, and the other five for \$8, when that one is gone, if you think best.' 'I will take them all now, I need them,' was my reply."

You have calls every day for salves, liniments, headache remedies, tonics, etc. Why not sell your own, and make a liberal profit, in place of the patents, the manufacturer of which pays one-half of his profits to the newspapers, cutting your profit to a few cents? When customers call for a box of cough lozenges, don't show them a 5-cent cough-drop. Hand them a 25-cent troche. This is the best; if they want a nickel cough-drop make them ask for it.

When a gentleman asks at your fountain for a laxative, do not suggest Seidlitz powder—there's nothing in it for you. Rather say: "We always have fresh solution citrate of magnesia on ice; doctors recommend it."

If he insists on having the Seidlitz powder let him have it, remarking, however, that it has ruined more stomachs than has beer.

When customers make you tired talking, don't show it; just think that's a quarter they owe you, and get it from them at the first opportunity. I have made a number of quarters that way, and after a while you will learn to like those customers and think they are all right.

When Mrs. Kicker complains that 85 cents was an overcharge on her prescription for four ounces of F. E. Cascara Sagr, U. S. P., that she had it filled at the "Would-be Pharmacy" for 60 cents, don't fly off and say you will not be undersold—that's what she wants. Tell her you do not doubt her; that the list price on the cascara you used in her prescription is \$3 per pound, though you can buy other manufacturers' cascara as low as 95 cents per pound, but you don't use that kind; that the other pharmacist possibly made more money filling her prescription for 60 cents than you did at 85 cents; that you always give your customers the very best drugs money can buy, and expect to get a reasonable price in return. Remember you must maintain your price, and your customers will learn that your prices are right, and never ask you to change them.

I chanced to hear two ladies talking on the street one morning. One said: "Let us go in here, and order the medicine sent up." The other, looking in, said: "Oh, no; there is no clerk in sight; maybe he is down the cellar, and we will have to wait, and I am in such a hurry. Let us go on to the next store; they always meet you at the door, and they know everybody, and just where to send the medicine." You lose many such orders by keeping out of sight, and more by not having help enough. Better have one extra clerk and keep him manufacturing in place of buying your tinctures, elixirs, and solutions. It will pay you well, and you can manage to have some one in the store all the time.

You should learn your customers' names, occupations, and places of business; and, when practicable, trade with them. When addressing customers, try to call them by name.

Do you know that it is more profitable to talk new perfumes and nice goods to your customers, while they are waiting, than it is the weather? Several young ladies come in to wait for a friend. You can show them the latest perfume, asking their opinion of it. They will give it every time, and thereafter come to your pharmacy for their perfumes. One said: "The dry-goods house is selling this week, only imported perfumes for 35 cents an ounce. How can they do it?" I said: "Girls, do you want to have some fun?" They said "Yes," and I said "Go over there and pick up the bottle, and look at the bottom, and you will see 'W. T. & Co.' Then ask the clerk in charge whether the French and English perfumers send to Philadelphia for bottles." It is not difficult to sell perfumes if you watch the opposition and know what they sell.

When the church people want you to give them an ad for their programme, don't take up all the paper with an ad about sponges, chamois, and merchandise of all kinds; put in a line like this:

BETTER THAN PRAYERS.

Have your Prescriptions filled at

"The Pharmacy."

Patients all get well.

Talking about ads—you cannot advertise your business any better than by having the best of everything—bottles, boxes, labels, and corks, strictly first-class.

Be careful to see that everyone who enters your store is treated just right; from the ragged newsboy, who asks for a drink of water with ice in it, to the most dignified lady customer you have. Treat all just as well as if they were visiting at your home. Some one will send that newsboy to the drug store soon, and he will come to your store. You ask him why, and he will tell you that it is because you always speak to him. It doesn't cost anything and pays well.

Do you read a drug journal? It will not hurt you to take three or four of the best. You can find time to read them. Have one sent to the house to read when you have a few minutes to spare waiting for a meal. When your doctor sent in a prescription for antipyrine and calomel in capsules, how nice the journal came in. "Doctor, my last journal has an item saying antipyrine and calomel are incompatible," handing him the journal. "Who would have thought it?" "Can I change it to podophyllin and antipyrine?" "Sure, that's good enough. I will return this journal this afternoon, I want to read it." That one instance is worth a year's subscription. After reading your journals, try to find what you can make out of them. See if you cannot use one of their hints to advertise your business, or one of their formulas for something new; and when you decide upon a good one, make plenty of it, put it to the front, and push it. Say "We make it." Your journals will then not cost you anything; on the contrary, you will make money out of every number.

When poor old traveling Bill comes in, don't say "Don't want anything." Look him over, compare prices, ask him all you want to know about his line. If he is selling brushes, find out all about how they are made, difference in bristles, lengths of same, backs, etc. The arguments he puts forth are generally good talk for you to use with your customers when selling brushes. You cannot lose anything by giving him a few minutes. If he is traveling for a distillery, find out the difference between sweet and sour-mash whisky, about bourbon and rye, and the blended whisky, if you do not know. He will show you a good blended whisky telling you it is 60 per cent. rye, and 40 per cent. bourbon, and not blended until seven years old. Tell that to a customer and you will sell a gallon instead of a pint.

Were you ever asked to charge? Did you do it? If you did, I hope you got your money back; but I doubt it. You must think twice before putting a new name upon your books. Inquire who is to pay it, obtain the name in full, place of business, when he receives his pay, and then never let your bill go over pay day. Do not be satisfied with mailing the account. Go and see the party. Be friendly, but get your money. If he tries to stand you off, tell him you are willing to carry him for a part of it, but you must have part, or you cannot let him have any more credit. Should you decide that you made a mistake, and he is not worthy of credit, collect the bill if it costs you the whole amount. Get him off your books. So much for experience. Don't be afraid to sue or garnishee. Customers will learn that you are a good collector, and will pay so much easier; but if they think you slow, they will stand you off to pay others.

Then you have leaks through not charging your customers' accounts just the minute you are through serv-

tem. Delays are dangerous; you may never think of again. When the customer receives your statement of his account it is wrong, and he thinks: "Oh, he has charged me with stuff I never got, and the things I got charged; he is so careless. I will try some other store where they can keep books."

In checking your bills coming due this month, you have one from your stationer calling for \$104, one from your cigar manufacturer for \$210, and one from your drug house (for sundries) for \$280. The discount on stationery is 6 per cent., and cigars four months or five per cent., and sundries three months or 3 per cent.; and picking up your bank book, you see you could have discounted every bill, making \$6.24 on stationery, \$10.50 on cigars, and \$8.40 on sundries; making a total of \$25.14, lost through neglect. By waiting a few days before ordering that barrel of Haiper's whisky, you could have discounted that bill without feeling it.

You must watch your orders more carefully. In checking up your drug bill you find that last month you purchased at four different times a 14-pound bottle of F. E.aborandi. Why not buy a pound at once, and save paying for three extra bottles?

You are thinking about increasing your stock for the prescription department. Correspond direct with the manufacturer. See if it is not possible for you to purchase the quantity order, and receive 40 per cent. discount in place of 25 per cent. Furthermore, the manufacturer pays freight, which is quite an item. That extra 15 per cent. is what keeps the wholesalers, and in placing future orders you receive the same discount.

You should be on friendly terms with your neighboring druggist. You will find him a gentleman, and there are many things you could buy together, and thereby receive larger discounts. Try it. As business is now done on so close a margin, every discount is necessary for your success.

Be careful in marking stock. Mark the cost and selling price on everything—fluids, solutions and oils. Mark the price for an ounce, also for a pint, so that every clerk will have the same price. In the case of special prices, mark them on the labels in your cost mark. The clerk in a city pharmacy told the merchant, to whom he was trying to sell an \$18 toilet case, that it was a close price, when only three letters were in the cost mark, and the merchant knew at sight that it cost less than \$10. You should use a blind. On goods that sell for over a dollar have three letters in the cost mark; if over \$10, have four letters, even should it be necessary to use two letters for a blind. Many a sale has been lost to merchants and clerks who were familiar with cost marks, by not using a blind.

How about your doctors and your clerks? Do they drink? Do they smoke? And do they leave a quarter on the case when they retire? If they don't, you have a leak which it requires a strong effort to check.

Why is it your store is not opened at the same hour every morning? You had better investigate. There might be something in it which your clerk did not want to leak out (family troubles, perhaps). But what has that to do with the man kicking at your door, waiting to spend a dollar or more? Suppose he goes across the street, and finds the store looking neat, and you never see him any more? What then? You have lost a customer, that's all. Have you many to lose?

One word more. Pay your clerks an honest day's pay for an honest day's work. In the average mortal there is always an inclination to get even; perhaps it would not be a bad idea to remember this.

I sincerely hope some of my brother pharmacists may find in this article on leaks something profitable to them. (Merck's Report.)

—Druggists of Fayette County, Ia., have formed an association.

PHARMACY.

EUCALYPTUS-OPODELDOC.—Dissolve 90 parts soap in 750 parts alcohol, and add 45 parts camphor, 7.5 parts menthol, 22.5 parts oil of eucalyptus and 45 parts ammonia water. (Südd. Ap. Ztg.)

HEMATOGENUM SICCUM is a dry, odorless powder, representing about 7 times its weight of hamatogen. It is prepared from the latter by concentration in a vacuum and is used in form of pills, tablets, or powder. (Ap. Ztg.)

ONTIMENTS FOR HEMORRHOIDS.—(1) Camphorated lanolin, 40 parts; castor oil, 10 parts; white precipitate, 5 parts; conine hydrobromide, 2 parts.

(2) Lanolin, 120 parts; petrolatum, 75 parts; glycerin, 45 parts; extract of witchhazel, 30 parts; tannic acid, 4 parts; tincture of opium, 4 parts. (Ap. Ztg.)

MYRRH IN DIPHTHERIA.—Dr. Stroell has obtained good results in the treatment of diphtheria with a mixture of tincture of myrrh, 2 parts; glycerin, 4 parts; and water, 94 parts; in doses of a teaspoonful for children and a tablespoonful to adults. The effect is ascribed to the increase of leucocytes caused by the drug. (Südd. Ap. Ztg.)

CALCIUM CHLORIDE has been recommended as a remedy for urticaria and for chilblain, in view of the observation that it increases the coagulating power of the blood. The dose is 0.5 to 2 gm. (8 to 30 grains), gradually increasing. Very large doses are to be avoided, as they lessen the coagulating power. (Südd. Ap. Ztg.)

TREATMENT OF CHRONIC CONSTIPATION WITH CREOSOTE has been found very encouraging by de Holstein (Sem. Med.). It relieves constipation without a direct purgative effect, also increases the appetite and improves the complexion. It is recommended not to take it in pills, perls, or in alcoholic solution, but immediately after meals twice daily in doses of 6 to 8 drops, in a glass of beer, milk or water, with or without wine. The treatment is begun with 1-drop doses, gradually increasing until the desired effect is obtained, and must be continued during several months, the dose being decreased toward the end. (Ap. Ztg.)

WHAT IS AMBERGRIS?—H. Beauregard is authority for the following information in the Comptes Rendus (Pop. Sci. Monthly): Ambergris is a calculus which is developed in the rectum of the sperm whale. This calculus is composed of crystals of ambrine mixed with considerable black pigment from the rectal lining and star-coral debris. When it is fresh it is of a soft consistence and its color is not at all agreeable; but if preserved for several years away from the air, it loses its disagreeable odor and retains merely a delicate perfume sui generis, which gives it great commercial value. This change is due to a microbe for which the author proposes the name *Spirillum recti physeteris*.

AN ELECTROLYTIC PROCESS FOR MANUFACTURING IODOFORM has been patented by Schering's Farbenfabriken. It consists in the electrolysis of a solution of potassium iodide, sodium carbonate and alcohol. The proportions most suitable are: Water, 100 p.; potassium iodide, 16 p.; sodium carbonate, 5 p.; and alcohol, 10 p. A rapid current of carbon dioxide is passed into the solution to convert into carbonate the caustic potash as soon as formed, the presence of which would be injurious to the formation of iodoform. The temperature is kept at 60 to 67° C. About 80 per cent. of the iodide is converted into iodoform; the remainder can be

converted only with a considerable waste of electrical energy. (Chem. Zentralb., through Ap. Ztg.)

COMPOSITION OF SOME NEW REMEDIES.—Capressin, a preparation recommended for whooping cough, is said to be nothing more than oil of cypress (*Cupressus sempervirens* L.). Bavarol, a disinfectant, is stated by Dr. Aufrecht, to resemble lysol very closely in action and properties. Capsule tonico-purgative di taurina, which are claimed to contain 0.25 gm. (4 grains) each of ox gall, are composed of aloes 0.05 gm. (45 grain), scammony 0.1 gm. (1½ grains), and ox gall 0.1 gm. (1½ grains). Antinonin contains, according to Dr. Philipp, the potassium salt of ortho-di-nitro-cresol as active constituent. Diabetic, a beverage containing no sugar and resembling champagne, recommended to diabetics, has the following composition, according to Dr. Aufrecht: Alcohol 8.25, extractive matter 3.27, reducing substance 0.02, tartaric acid 0.56, mineral matter 0.14, phosphoric acid 0.025, sulphuric acid 0.036, carbonic acid 0.45, saccharin 0.023, and glycerin 0.82 per cent. Eau Capillaire is a hair preparation consisting of quinine 0.14, glycerin 5, alcohol 68.9, water 25, Peru balsam 2 per cent., aromatics, and traces of lead. Iron Vitellinate, an emulsion containing, according to Aufrecht: Water 73.27, solid matter 23.23, alcohol 1.5 per cent. The solid constituents are composed of fat 43.89, albumins 51.2, mineral salts 4.91, and iron 0.39 per cent. Elixir Gadinneau, claimed to be a solution of beef extract and recommended for anemia, contains sodium chloride 0.46, pepsin 2, alcohol 2, glycerin 5.65, sugar 24.5, and water 65.5 per cent. (Ph. Ztg., through Ph. Rundschau.)

THE FRUIT CURE.—The so-called "fruit cure," although not much heard of in England, says Nature, (Sci. Am.), is well recognized at various places on the Continent, where so-called grape cure stations have been established. In a recent number of Modern Medicine and Bacteriological Review there is an interesting article on the subject, in which the historical side of the question is dealt with. Thus we are told that many medical authorities in the tenth century became enthusiastic in their writings over the remarkable curative virtues of grapes, while a certain Van Swieten, of a more modern date, is said to have "recommended in special cases the eating of twenty pounds of strawberries a day." The same gentleman also reports a case of phthisis healed by strawberries, and cites cases in which maniacs have regained their reason by the exclusive use of cherries as food! These instances rather savor of the miraculous; but there is no doubt that the so-called grape-cure, for indigestion and other evils, is carried on in many places on the Continent, and that people betake themselves to Meran, Vevey, Bingen, or to Italy and the south of France with the intention of devoting six weeks to the cure, during which time they are expected to have gradually accomplished the feat of consuming from three to eight pounds of grapes daily, as the case may be. Grapes are said to exercise a salutary action on the nervous system and to favor the formation of fat, that is to say, when fruit of good quality is employed; if the grapes are not sufficiently ripe, and are watery and sour, the patient may lose rather than gain in weight. Dr. Kellogg, director of the Sanitarium Hospital and Laboratory of Hygiene at Battle Creek, Mich., is of opinion that the valuable results obtained by a fruit diet in cases of biliousness which he has observed are due to the fact that noxious germs habitually present in the alimentary canal do not thrive on fruit juices.

ELIXIR CHLORHYDROPEPSIQUE.—The following formula is given by the "Boll. Farm.:"

Pepsin	3 gm.
Distilled water	50 gm.
Extract of coca	5 gm.
Extract of quina Loza	5 gm.
Sugar	50 gm.
Sherry wine	100 gm.
Hydrochloric acid	10 drops

Dissolve without heat and filter through paper.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulae and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.
Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Queries From Non-Subscribers Not Answered.

(Creamo Medicated Gum Company, Stevens Point, Wis.) Read the heading at the top of this column.

Coloring Electric Light Globes.

(N. H. B.) See this journal, March 3, 1898, page 328.

Medical Specialists.

(L. A.) We do not publish the names of specialists in the treatment of any kind of disease. You should have no difficulty in obtaining information of this character from the regular physicians with whom you come in contact. Any one of them can serve you.

Manufacturing Hydrogen Peroxide.

(J. K.) We know of no better method adapted to manufacturing hydrogen peroxide upon the small scale than that furnished by the Pharmacopoeia. Some information upon one or two other methods of manufacture is given in this journal, June 1, 1894, page 512.

Varnish for Photographic Trays.

(G. R.) Use asphaltum varnish, or coat the bottom and sides of the wooden tray with:

Resin	1 part
Beeswax	2 parts
Paraffin	3 parts

Melt these together, warm the tray, and while hot apply with a brush.

Carbon Paper.

(G. R.) The following is from the Era Formulary:

Lard	6 parts
Yellow wax	1 part
Lamplack	1 part

The melted fats are gradually poured into the warm mortar containing the lamplack, triturating well all the time. While still fluid apply with a brush to the paper and wipe off any excess.

Purification of Acetic Acid.

(J. B.) It will be much more satisfactory for you to procure a purified acetic acid than it would be to undertake to remove the smell of wood from the samples to which you refer. These may, however, be purified by one of the methods used in manufacture, viz., treatment with soda ash, decomposing the product thus formed (sodium acetate) with sulphuric acid, and recovering the acetic acid by distillation. A careful reading of the article on acetic acid in one of the dispensatories will furnish you with most of the information on this subject.

Solution Sodium Biborate as a Gargle.

(J. B. F.) asks how much sodium biborate should be dispensed on the following prescription:

R
Solut. sodii biborat. grs. xx ad 5 iij
Sig. As a gargle.

Probably twenty grains to each fluid ounce, or two hundred and forty grains. From the directions to the patient, it appears that the prescriber intended the solution to be used as a gargle and as solutions of borax of this strength are somewhat frequently employed as gargles, we think we may safely assume a similar solution is wanted here. Upon the other hand, a solution containing 20 grains of borax in twelve ounces of water would be too weak to be of much service as a gargle. However, it would be well to consult the physician.

Construction of Welsbach Light.
(E. W. M.) The chemicals constituting the incandescent mantle of the Welsbach gas burner are principally the oxides of zirconium, lanthanum, thorium, and yttrium. The mantle is made by first impregnating a woven fabric with a chemical compound containing salts of the above metals. On lighting the first time the fibrous substance is consumed, leaving behind the fragile cone of the above oxides, which, when heated to intense whiteness by the gas flame underneath, shines with great brilliancy. For an extended article on this subject, see this Journal, Jan. 9, 1896, page 48.

While Hair on Stock.
(J. E. S.) We know of no "formula for growing white hair on stock after the hair has been cut short." A blaze or star in a horse's face may be made, according to an old veterinarian, in the following manner: Take a razor and shave off the hair the form and size of the blaze or star to be made; then take a small quantity of oil of vitriol and with a feather apply to the part once, which will be quite sufficient. After the application of the vitriol the part will become a little sore and inflamed, though it may be readily healed by washing the sore with coppeiras water. Great care should be used to prevent the vitriol from getting on the surrounding skin or upon the clothing. The above procedure may be somewhat cruel, but it is one of the methods used by jockeys for the purpose. It could hardly be applied on an extended scale to any animal.

Balsam Gum.
(E. H. M.) We can give no additional information regarding the identity of the fourth ingredient in the following prescription, first commented upon in this journal, March 3, 1898, page 529:

R.
Spts. frumenti,
Vin. vinegar,
Mel aa ʒjv
Balsam gum ʒ j
Sig. As directed.

You were not justified in dispensing balsam of fir for "balsam gum" in this prescription unless you positively knew that substance was wanted by the prescriber. We can find no authority for the use of the term and no one of several competent dispensers here to whom the prescription was referred could give a satisfactory explanation of the substance wanted. The term is not in any of a number of reference books at hand and we think your only recourse for authoritative information is the prescriber.

Percolation of Tincture of Opium.
(L. R. B.) The remarks on this subject in the Era of Jan. 24, 1895, page 111, to which you refer, apply to the percolation of tincture of opium and not to the preparation of deodorized tincture of opium. However, the use of powdered opium as directed in the official formula has proven unsatisfactory to many workers, even with the addition of precipitated calcium phosphate, which some claim appears to prevent the thorough extraction of the morphine. To obviate these difficulties Kebler and La Wall have advocated the use of granulated opium instead of powdered opium in preparing the tincture. In order to avoid the extractive matter which chokes up the percolator, Mr. Kebler recommends that only one-third of the granulated opium be introduced into the percolator at first. Sufficient menstruum is then poured on to cover it and to saturate the remainder of the opium which is added; then, percolation is immediately begun and continued until about 10 per cent. of the tincture has percolated, when the orifice is stopped for three hours and 10 per cent. more obtained; and so on, alternating maceration and percolation until the required quantity is obtained.

Manufacture of India Ink.
(J. A. P.) See report of Mr. Frazer, British Consul at Wuku, China, this journal, Aug. 12, 1897, page 204. India ink suitable for most commercial purposes may be made as follows (Lehner): (1) Purify fine lampblack by washing with caustic soda, dry and make into a thick paste with a weak solution of gelatin containing a few drops of essence of musk and about half as much ambergris. Mould and dry. Instead of gelatin, the following solution may be used: Seed lac, 1 oz.; borax, 1 1/4 oz.; water, 1 pint. Boil until solution is effected and make up with water to 3/4 pint. (2) For making a deep-black India ink which will also give neutral tints in its half shades, rub thoroughly together 8 parts of lamp-black, 64 parts water and 4 parts finely powdered indigo. Boil the mixture until most of the water has evaporated, then add 5 parts gum arabic, 2 parts glue and one part extract chicory. Boil the mixture again until it has thickened to a paste, then shape it into wooden moulds which have been rubbed with olive or almond oil.

Breath Perfume.
(J. B.) Try one of the following:
(1) Powdered orris root 5 ounces
Musk 5 grains
Coumarin 12 grains
Vanillin 10 drops
Oil rose 10 drops
Oil neroli 10 drops
Oil peppermint 20 drops
Oil spearmint 20 drops
Oil ylang ylang 5 drops
Purified extract of licorice, sufficient.
Mix the orris root with the remaining ingredients, add enough extract to form a mass; divide into pellets or roll out flat and cut into pieces.

(2) Sugar 3 ounces
Licorice 3 ounces
Oil anise 20 drops
Oil fennel 5 drops
Purified extract of licorice, sufficient.
Hager gives this one:
(3) Extract licorice,
Distilled water, of each 100 parts
Powdered catechu 30 parts
Powdered gum arabic 15 parts

Mix and by the heat of a water bath evaporate to the consistency of a thick extract; while still warm incorporate the following reduced to fine powder:
Florentine orris root,
Cascarilla bark,
Mastic, of each 2 parts
After the mass has partially cooled, thoroughly incorporate:
Oil peppermint 2 parts
Tincture ambergris,
Tincture musk, of each 1-5 part
Form into small pastilles or pellets.

Albumin in the Urine.
(A. J. K.) The presence of excessive amounts of albumin may be due to one of a number of pathological conditions and the administration of any remedies for its removal should be under the direction of a competent physician. In a general way albumin in the urine may result from mechanical interference with the renal circulation from congestion, lesions and organic diseases of the kidneys themselves; from toxic substances in the blood, such as lead, in which case there is a granular form of nephritis; from changes in the blood due to various diseases, anemia, purpura, scurvy and sepsis; in pyrexia; in certain nervous disorders, such as tetanus, delirium tremens, apoplexy, Graves' disease and epilepsy; in various functional disorders, as dyspepsia, high living, great exertion, etc. (Gould.) It is thus obvious that the physician must determine the cause of the presence of albumin in urine before he can intelligently prescribe for any of the diseases of which the excretion of albu-

min may be looked upon as an accompanying symptom. Thus, in albuminuria dependent upon a relaxed, atonic state of the kidneys gallic acid has been used with advantage. In cases of albuminuria due to "renal atony" lactate of strontium has been employed, though in the presence of uremia and certain other symptoms, it is said to be contra-indicated. In the albuminuria accompanying Bright's disease the various iron combinations have been suggested, more particularly the tincture of ferric chloride. Arsenic, capsicum, salts of mercury, etc., are other remedies which have been employed for a similar purpose.

Soda Syrups Containing Iron and Celery Phosphates.

(J. L. K.) Try the following:

Iron Tonic Phosphate.

Malt extract (No. 167 N. F.)	4 fl. ounces
Vanilla syrup	$\frac{1}{2}$ pint
Syrup	20 fl. ounces
Solution acid phosphates	2 fl. ounces
Essence bitter almond	1 fl. ounce
Iron hypophosphate	15 grains
Water	1 ounce

Dissolve the iron pyrophosphate in the water before mixing with the other ingredients.

If you desire to use an "acid phosphate" containing iron, try the following from "Manual of Beverages:"

Iron citrate soluble	64 grains
Chalk, precipitated	144 grains
Potassium bicarbonate	72 grains
Sodium phosphate	64 grains
Phosphoric acid, 50 per cent.	4 ounces

or,	
Phosphoric acid, U. S. P.	2½ fl. ounces
Water, enough to make	16 fl. ounces

Mix the acid with enough water to make 12 fluid ounces, and gradually add the chalk, followed by the potassium and sodium salts, stirring constantly until solution is effected. Dissolve the iron citrate in 4 fluid ounces of water by the aid of heat, allow the liquid to cool, add to the preceding mixture, allow the whole to stand for several days and filter. The following observations on serving "phosphates" at the fountain are of interest: Phosphates are served "solid," i. e., without foam. The proper method is to draw an 8-ounce glass seven-eighths full of carbonated water, then filling the glass with syrup, about 1 fluid ounce, adding 1 or 2 fluid drams of acid phosphates, and stirring with a spoon. The syrup employed must be the one corresponding with the phosphate desired, lemon syrup for lemon "phosphate," orange syrup for orange "phosphate," etc. The solution of phosphates may be kept in a bottle and the proper quantity measured into a small graduate, or it may be kept in a bottle with a squirt tube, the proper amount of solution to be dashed into the syrup.

Celery Phosphate Syrup.

Syrup (flavored with celery essence)... 1 quart

Solution of acid phosphates 1 ounce

Mix.

For some other formulas which may be modified to meet your wants, see this journal, April 29 and May 13, 1897, pages 504 and 506, respectively.

Syrup Hypophosphites Compound.

(L. M.) We cannot give the formula for the proprietary preparation. A syrup containing the hypophosphites generally employed may be prepared from formula No. 378, National Formulary. Here are two others:

(1) Calcium hypophosphate	256 grains
Potassium hypophosphate	128 grains
Sodium hypophosphate	128 grains
Manganese hypophosphate	16 grains
Solution iron hypophosphate (N. F.)	16 minims
Quinine hydrochloride	8 grains
Strychnine hydrochloride	1 grain
Sugar	16 ounces
Distilled water, enough to make	16 fl. ounces

Dissolve the calcium salt in 4½ fluid ounces of water, the potassium and sodium salts in 1 fluid ounce, the man-

ganese hypophosphate in 1 fluid ounce, and the strychnine hydrochloride in ½ ounce of water, respectively. Rub the quinine hydrochloride with the sugar and introduce into a graduated bottle; add all the solutions except the iron, and agitate till the sugar is dissolved, or nearly so; then add the iron solution and enough water to make 1 pint. Shake well and set aside for ten days; then filter through paper. The syrup thus made is of a greenish straw color, and very beautiful.

(2) Iron sulphate, crystals	128 grains
Manganese sulphate, crystals	128 grains
Quinine sulphate	64 grains
Strychnine sulphate, crystals	8 grains
Hypophosphorous acid, 10% N. F.	4 fl. drs.
Calcium hypophosphate	1½ ounces
Distilled water, enough to make	1 pint

Dissolve the sulphates in 4 fluid ounces of water, adding half the amount of the hypophosphorous acid; the hypophosphate of calcium is dissolved in 9 fluid ounces of water with the aid of the remainder of the acid. Having filtered the two solutions separately, they are mixed in a suitable vessel, shaken up well, and set aside to rest for three days. The solution of the hypophosphate of iron, quinine, manganese and strychnine, thus obtained, is then poured off from the precipitate and filtered, and the precipitate is washed with enough water to make the filtrate measure 1 pint. Once this solution is finished it is an easy matter to finish the syrup, as follows:

Calcium hypophosphate	34 drams
Potassium hypophosphate	17 drams
Sodium hypophosphate	17 drams
Sol. Hypophosphate (as above prepared)	16 fl. ounces
Orange-flower water	4 fl. ounces
Glycerin	4 fl. ounces
Sugar	6 pounds av.
Distilled water, enough to make	1 gallon

Dissolve the hypophosphites in 3 pints of water, add the orange-flower water and filter; then add the remaining ingredients. Dissolve the sugar, by agitating without heat, and strain through cotton, which is best effected by placing in the neck of a one-gallon glass percolator at first a plug of excelsior and on top of that some cotton; the syrup runs through very quickly, and is quite as bright as if filtered. Each fluid dram of this syrup contains 2 grains of the hypophosphate of calcium, 1 grain each of the hypophosphites of potassium and sodium, ½ grain of each of the hypophosphites of iron and manganese, 1-16 grain of the hypophosphate of quinine, and 1-128 grain of the hypophosphate of strychnine. This preparation is of the same strength as that of the National Formulary, with the exception that it directs strychnine to be used instead of tincture of nux vomica.

EFFECTS OF LIQUID AIR.

During the recent dedication of the new physical-chemical institute of Leipzig University, Prof. Ostwald conducted a number of highly interesting experiments to show the action of liquid air, through the intense cold caused by its evaporation, upon the physical and chemical properties of various substances. It has been found possible to construct glass containers in which large quantities of liquid air can be stored. This fluid has a gray-blue color and is turbid from the presence of solid carbonic acid suspended in it, which can be readily removed by filtration. A rubber tube introduced into liquid air becomes as hard and brittle as glass. Cinnabar loses its characteristic red color and changes to a reddish-yellow. Liquids become viscous, crystallize or solidify. Hydrochloric acid forms a thick syrup; ether becomes as hard as stearin. Chlorine gas changes to a yellow fluid; ammonia gas the same. Illuminating gas loses its lighting power, and hydrocarbons, as benzol and ethylene, separate out. Oxygen gas, introduced into liquid air under ordinary atmospheric pressure, becomes liquid; hydrochloric acid freezes, accompanied by such violent contraction that the receptacle threatens to break. (Ph. Zig.)

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Ellas H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virell Coblenz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Wilber G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Ph.M.B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M.D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Walling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 55.

Inorganic Chemistry.

The Alkaline Earth Metals.

	Symbol.	Valence.	Atomic weight.	Specific gravity.
Beryllium	Be.	2	9.05	1.85
Magnesium	Mg.	2	24.3	1.75
Calcium	Ca.	2	39.91	1.6
Strontium	Sr.	2	87.3	2.5
Barium	Ba.	2	136.9	3.75

This family forms a natural transition from the alkalis to the heavy metals. They are less basic or positive than the former, and are also heavier, while they are more basic and have a lower specific gravity than the metals which follow.

The first two are silver-white in color, and the last three yellow. All are malleable and ductile and have a brilliant luster when free from oxid. When heated in air they take fire and burn with brilliant light.

Like the metals of the alkalis, their metallic character, affinity for oxygen and ability to decompose water increase with the atomic weight. Beryllium does not decompose water either cold or hot, magnesium decomposes boiling water, while calcium, strontium and barium decompose water at ordinary temperatures, the energy of the reaction increasing with the atomic weight. Like the alkalis, the last three must be preserved under petroleum.

All combine with oxygen to form monoxides, and these may unite with water to form hydroxids. The latter vary in solubility according to atomic weight, the hydroxid of beryllium being insoluble and the solubility of the other three increasing to the quite soluble barium hydroxid. The solubility of their sulfates varies in the reverse order, those of beryllium and magnesium being freely soluble, calcium sparingly soluble, strontium almost and barium sulfate quite insoluble.

Like the other groups of elements, these vary greatly in their abundance and usefulness. The first and the last two are comparatively rare, and of minor importance. Magnesium and calcium are relatively abundant and widely distributed. Magnesium is the only one of the group used to any extent in the metallic state. The compounds of magnesium and calcium are of great importance both in medicine and in the arts.

BERYLLIUM (GLUCINIUM.)

Symbol Be (or Gl). Valence 2. Atomic Weight 9.05. Specific Gravity 1.85.

Historical.—Beryllium was first noted as an element by Vauquelin in 1798, but was not obtained in the elementary condition until the year 1828 by the chemist Wöhler. It was formerly known as glucinum, from *glukus*, sweet, in allusion to the sweetish taste of its salts, but is better known as beryllium, from the name of the mineral, beryl, in which it was first found.

Natural Occurrence.—Beryllium occurs in nature principally in beryl, a metasilicate of beryllium and aluminum. Common beryl is found in hexagonal prisms, usually of a greenish color, sometimes colorless. The transparent varieties are known as precious beryl. These when green are known as emerald, and when bluish green as aquamarine. Blue, yellow and rose red varieties are also known. Other silicates containing this element are known.

Preparation.—The element may be obtained by fusing together its chlorid with metallic sodium or potassium, or by electrolysis.

Description and Physical Properties.—It is a silver-white metal, more fusible than silver, does not oxidize readily in the air, but when heated in the form of powder burns with great brilliancy. It is soluble in the mineral acids, and in solutions of the fixed alkalis.

COMPOUNDS.

Beryllium forms one oxid, BeO, and one hydroxid, Be(OH)₂. The latter is obtained as a gelatinous precipitate when beryllium solutions are precipitated by ammonia, and when dried forms a bulky white powder, which is converted into the oxid by ignition.

Other compounds are the chlorid, sulfate, nitrate, phosphate and carbonate, which resemble closely the corresponding compounds of magnesium.

Characteristic Reactions.—Beryllium may be separated from the other metals by the solubility of its oxid in the fixed alkalis and its insolubility in ammonia. It does not

color the non-luminous flame, nor yield a spectrum with the bunsen flame, but presents a characteristic spark spectrum when placed between terminals from which electric sparks are passing.

MAGNESIUM.

Symbol Mg. Valence 2. Atomic Weight 24.3. Specific Gravity 1.75.

Historical.—The compounds of magnesium, especially the carbonate, sulfate and oxid, have been known for a long time. The metal was first isolated by Davy about the year 1807 or 1808. The name is probably derived from Magnesia, a town in Asia Minor, where the carbonate was formerly obtained.

Natural Occurrence.—The compounds of magnesium are widely distributed. The chlorid and sulfate are found in sea water and in certain brine and mineral springs. It occurs also as dolomite, a double carbonate of magnesium and calcium, as magnesite, $MgCO_3$, as the double sulfate or double chlorid of magnesium and potassium, and as the base of many important natural silicates, as asbestos, talc, meerschauum, etc.

Preparation.—Magnesium can be prepared either by the electrolysis of its chlorid, or by decomposing that compound by heating with metallic sodium or potassium, and purifying by distillation.

Description and Physical Properties.—Magnesium is a silver-white, hard, malleable and ductile metal. Its specific gravity is 1.75. It melts at a red heat and can be distilled at a temperature slightly above the boiling point of zinc. As usually seen in the laboratory it is in the form of thin ribbon, made by flattening magnesium wire between rollers.

Chemical Properties.—The metal preserves a brilliant luster in dry air, but in presence of moisture slowly becomes coated with a layer of oxid. It decomposes boiling water, uniting with the oxygen and setting free hydrogen. Heated in the air it burns with an intensely brilliant white light. The light is rich in actinic rays and is employed in preparing the flash-light powders used in photography. It is soluble in acids with evolution of hydrogen, and on account of its freedom from arsenic is sometimes used in Marsh's apparatus in place of zinc.

COMPOUNDS.

Oxygen Compounds.—The element combines with oxygen to form the oxid, MgO . This is the common "magnesia," or "calcined magnesias," of the shops, and is produced when the metal is burned in air. Commercially it is obtained by igniting the carbonate to drive off carbon dioxide. The product is known as "heavy magnesia" when obtained from the carbonate and as "light magnesia" when obtained by ignition of the light carbonate. The light magnesia may also be made denser by making it into a paste with alcohol and triturating in a mortar. It is said to be soluble in 55,000 parts of either hot or cold water.

The hydroxid, $Mg(OH)_2$, is obtained by precipitating any of the soluble salts of magnesium by an alkaline hydroxid. Its properties are, in general, like those of the oxid.

Halogen Compounds.—The element forms a chlorid, $MgCl_2$, a bromid, $MgBr_2$, an iodid, MgI_2 , and a fluorid, MgF_2 . These are generally deliquescent, instable, and decomposed by heat.

Magnesium Salts of the Oxygen Acids.—The most important of the magnesium compounds are its salts with the oxygen acids, several of which have an important place in pharmacy and medicine.

The sulfate is commonly known as Epsom Salt, from having first been obtained from the waters of a mineral spring at Epsom in England. It crystallizes with seven molecules of water, $MgSO_4 \cdot 7H_2O$, and is isomorphous with, i. e., has the same crystalline form as, zinc sulfate. It is used principally as a cathartic.

The normal or orthophosphate, $Mg_3(PO_4)_2$, is found as a constituent of bone. Magnesium-ammonium phos-

phate, $MgNH_4PO_4$, is deposited in oblong, plate-like crystals from alkaline or faintly acid urine, and is a frequent constituent of urinary calculi.

Other important compounds of magnesium are the several forms of the carbonate. The normal carbonate, $MgCO_3$, is found in nature as Magnesite, and may also be prepared artificially. When a magnesium salt in solution is treated with an alkaline carbonate it yields a precipitate of more or less basic carbonate, or a mixture of the normal carbonate with the hydroxid, as $2MgCO_3 \cdot Mg(OH)_2$, the exact composition depending upon the temperature and concentration of the solution, etc.

These basic carbonates are usually seen in the shops in the form of cubical blocks, and sold as magnesia alba, or white magnesia. It is used as a cosmetic, in medicine as a gentle laxative, and as the source of other magnesium preparations. Both a light and a heavy variety are known. It is but slightly soluble in water, more so in water containing carbon dioxide.

Characteristic Reactions.—The metal may be known by its appearance, low specific gravity, and its burning with a brilliant light when held in the bunsen flame. The compounds of magnesium do not color the non-luminous flame, or yield a flame spectrum. With the electric spark, however, they yield several characteristic green lines.

In solution magnesium is distinguished from calcium, strontium and barium by not yielding a precipitate with sulfuric acid or with ammonium carbonate *in the presence of ammonium chlorid*, and by the crystalline precipitate produced by sodium phosphate when added to dilute ammoniacal solutions.

CALCIUM.

Symbol Ca. Valence 2. Atomic Weight 39.91. Specific Gravity 1.6.

Historical.—Owing to their wide distribution and importance in building operations certain compounds of calcium have been known since the earliest times. Probably all nations which have been builders have been familiar with the production of quick-lime from limestone, and with the manufacture of mortar. The metal was first obtained by Davy in 1808 by the electrolysis of its chlorid in the presence of mercury. The name is derived from calx, the Latin title for lime.

Natural Occurrence.—Nearly all soils, rocks and waters contain calcium compounds, either as carbonate, sulfate or phosphate. The principal mineral, however, is the carbonate, known as limestone when coarse and granular, as chalk when soft and friable, and as marble when distinctly crystalline. These three forms of the carbonate form vast beds of rock over many portions of the earth's surface. The same mineral is found in the stalactites of caverns, and in the deposits from calcareous springs. The phosphate is found in vast deposits as amorphous rock in Florida and in other Southern States, and crystallized as the mineral apatite. One of the principal mineral constituents of bone is calcium phosphate, derived from vegetable food, and by vegetation derived from the soil.

The sulfate is found in solution in sea water and in nearly all surface waters. It is found in beds somewhat resembling limestone, and is known as gypsum. When crystalline this is known as satin spar, or when in large masses of fine grain and color, as alabaster.

Preparation.—The metal may be obtained by the electrolysis of its chlorid, or by decomposing its chlorid with potassium or sodium, sometimes in the presence of zinc.

Description and Physical Properties.—Calcium is a lustrous, yellow metal, harder than lead, and is malleable and ductile. Its specific gravity is about 1.6 and it fuses at a bright red heat.

Chemical Properties.—It is permanent in perfectly dry air, but in the presence of moisture is quickly converted to the hydroxid. When heated in air it burns with a

bright yellow light. Thrown upon water it decomposes that liquid with about the same energy as metallic sodium, taking up oxygen, and releasing hydrogen, the oxid produced combining with the water present to form the hydroxid.

PRACTICAL STUDIES.

1. With a pair of pliers or pincers hold a piece of magnesium ribbon, 10 to 12 cm. long, in the flame of the lamp until it ignites. What kind of substance remains after the wire has burnt? What is its probable com-

position? Write an equation showing the probable reaction.

2. Add first ammonium hydroxid and then ammonium carbonate solution to a solution of magnesium sulfate. Is a precipitate produced? Write an equation.

3. To some solution of magnesium sulfate add some solution of ammonium chlorid, and then follow with ammonium hydroxid and carbonate as before. Is a precipitate produced in this case?

4. To the last solution add sodium phosphate test solution. Examine the character of the precipitate produced.

LECTURE NO. 56.

Pharmaceutical Microscopy.

Manipulation and Care of the Microscope.

Microscopical Technique.—A microscope without a knowledge of the microscopic technique is a possession of very doubtful value, and many a purchaser of a fine instrument has found to his surprise, and doubtless also to his chagrin, that he is unable to see as much with his complicated apparatus of tubes and lenses as with the eyes which nature gave him. After a few spasmodic efforts to see something with his costly purchase and as many humiliating failures, the instrument is laid aside, with a feeling of resentment toward those who have told him of the interest of microscopy, or else believing that the manufacturers have swindled him with a worthless instrument.

The microscope really is a useless instrument to one who does not know how to use it, but with patience, practice and study it may become a faithful and valuable servant, capable of rendering the highest service to physician, pharmacist, or to the student of nature.

Setting up the instrument.—It is well to have a uniform method of setting up and making the instrument ready for observation.

The stand is best removed from its case by grasping it firmly by the pillar and withdrawing it gently, and without jerking. The draw-tube may then be extended by grasping the milled ring at the top and pulling it gently upward while holding the body with the left hand. If the body is not held, the pull on the draw-tube puts an unnecessary strain on the coarse adjustment. The same method should be followed in closing the instrument.

The standard of tube length varies with different manufacturers. That adopted by the Bausch and Lomb Optical Company is 160 mm. for the short, and 216 mm. for the long tube length.

An ocular is next placed in the draw-tube, the body racked up so as to give plenty of room above the stage and an objective screwed into the nose piece at the bottom. In performing the latter operation, the objective should be supported by the fingers of the right hand and turned with the left. The object of this precaution is to provide against the danger of a fall, since objectives, oculars, condensers, and similar pieces of apparatus are easily injured by dropping on the floor or table.

Focusing.—Focusing is the adjustment of the optical parts so as to afford a clearly defined image to an eye placed at the ocular.

A ready prepared object of some kind, as a diatom or insect wing, mounted on a slide, is placed on the stage and held by the spring clips. The mirror is then adjusted so as to give a bright spot of light directly upon the object, and the front lens of the objective. Observing the objective, *but not looking through the tube*, rack the body down with the coarse adjustment until

the front of the objective is less than its focal distance from the object, i. e., if a half inch objective is used, it should be brought to within less than half an inch of the cover glass on the slide. Now looking *through* the ocular, the body is slowly racked upward with the coarse adjustment until the object comes into view. If nothing appears remove the eye from the ocular and again rack the body down to less than the focal distance.

The reason for always looking at the outside of the objective while racking downward is to avoid striking the cover glass with the front of the objective, which is certain to occur some time with every microscopist unless this practice is strictly adhered to.

Illumination.—Illumination includes all the methods by means of which light rays are brought to bear upon the object and their transmission through it, or reflection from it into the front combination of the objective.

The light used should be steady and brilliant, but not glaring. Direct sunlight is too intense and should never be employed. The best is the subdued light reflected from a white cloud or through a north window, from a white wall or screen, or from one of the lamps previously described.

If in the preceding operation the microscope has been placed in front of the window, the shade should be drawn down until the upper side of the stage is screened, so that the only illumination of the object is that which comes from the mirror. When artificial light is employed, the lamp should also be screened in some way. In almost every case, it is important to prevent any light rays from entering the objective or the eye except those which come from the object itself, and hence take part in the formation of the image. For this reason also, the diaphragm should be as near the underside of the slide as possible, and the diaphragm aperture, when no condenser is employed, should be approximately of the same size as the front combination of the objective. Only by trial, however, can the best size of aperture be determined.

Having arranged these matters satisfactorily the examination of the object should be continued, changing the inclination of the mirror, if necessary, and turning the fine adjustment back and forth until the most distinct image is obtained.

All parts of the object should be carefully examined, moving the slide gently back and forth, and changing the focus as needed by means of the fine adjustment.

In this operation it will be noticed that the apparent motion of the object is contrary to the real motion, or that pushing the slide to the right causes the image to move to the left, and vice versa.

Use of the Eyes. Eye Shade.—As far as possible the stu-

dent should aim to keep both eyes open while using the microscope. At first outside objects, as the hands, base of the stand, etc., will keep intruding themselves upon the attention, but gradually the habit will be acquired of seeing only the objects within the field of the microscope. This will be less difficult, if proper precautions have been taken to screen away the excess of light as previously suggested. Ward's eye shade (Fig. 33) is a device made use of to screen the unused eye from



Fig. 33. Ward's Eye Shade.

the sight of the objects below. A very satisfactory home-made article may be devised from cardboard and covered with black cloth, or dark paper with a dead surface.

The habit should be acquired of using the eyes alternately, and of ceasing to work whenever a sense of fatigue comes on. By so doing, and avoiding the employment of light too intense in its quality, the use of the microscope serves to strengthen instead of weaken the sight.

Axial and Oblique Illumination.—By axial or central illumination is meant the illumination which results when the rays of light from the mirror are central or parallel with the optic axis of the microscope. To produce it the mirror bar should be placed in a straight line with the body, and the mirror then adjusted so as to show an image of the window or flame directly in the center of stage opening. Oblique illumination is produced when the mirror bar is swung to one side so as to cause the rays to pass obliquely through the stage opening. It is useful for bringing out fine details of structure which are not visible with axial or central light. It is necessary to remove the diaphragm, or swing it and the substage apparatus to one side when light of the greatest obliquity is desired.

Air and Oil Bubbles.—Two objects frequently seen, and useful for studying the difference between axial and oblique illumination, are air and oil bubbles. Air bubbles can be readily prepared by beating up a drop of mucilage on a slide, with a spatula, and placing a cover glass over the preparation. Seen through the microscope the bubbles will have a bright center and a broad dark border. Oil bubbles can be prepared by adding a drop of oil to the mucilage before heating up. The oil globe will much resemble that of the air, but may be distinguished therefrom by the action of oblique light.

Air and oil bubbles afford an easy method of determining whether the light is central or not. If a small bubble in the center of the field be selected, its dark margin will be of equal width all around when the light is exactly central. If the light be made oblique, the bright portion of the bubble will move to one side or the other. In the air bubble the bright spot will be on the opposite side from the mirror, and in the oil bubble on the same side.

Increasing the Amplification. For increasing the power or amplification of his instrument the microscopist has a choice of three methods, the use of a higher power objective, or eye piece, or by increasing the tube length.

It is generally considered the better practice when a higher power is desired to use a higher objective, rather than to add a higher ocular. The reason for this is that the ocular magnifies the image formed by the objective, and consequently magnifies its imperfections also. After having obtained the greatest amplification possible by means of his objectives, if the enlargement

is not sufficient, it is then increased by the addition of higher oculars.

The tendency among beginners with the microscope is always to use too high a degree of amplification. With accomplished microscopists the rule is always to use the lowest power which will yield distinct vision of the object under examination. This plan is adopted for several reasons. (1) The higher the amplification, whether due to objective, ocular, tube length, or all combined, the less will be the working distance, i. e., the nearer the objective must be brought to the object. (2) The greater the amplification the smaller the field of view or the smaller the portion of the object which can be seen at one time. Thus with low powers it may be possible to view a square centimeter or more of the object at one time, while with high powers such as the 2 m.m. objective and corresponding oculars, the portion which can be observed at one time may not be larger than the period which closes this sentence. (3) The higher the magnification, the less the illumination of the image. Since the image must be formed from the light rays which come from the object, it follows that the larger the image is made the less the amount of light which can go to form any part of it, and if the magnification be too great it may become invisible, or in other words it is possible to literally magnify an object out of sight. (4) Greater difficulty of focusing high powers. The amplification in any case should be sufficient to give a sharp, well illuminated and clearly defined image and no more.

Use of the Abbe Condenser and Immersion Lenses.—The preceding remarks will serve to show the reason for the Abbe condenser and the immersion objective. With low or moderately high powers, the mirror may afford abundant illumination without any additional aid, but with the high powers it is necessary to use some special means of illumination. The use of the Abbe condenser is to increase the amount of light which passes through the object, which it does by taking the large amount of light which enters through its wide lower lens and condensing it into a narrow beam of great intensity. The method of using the condenser has been sufficiently indicated in the description of the instrument, and it is only necessary to add that in order to give the best results it must be carefully focused, and that it may be used as an immersion lens by joining its upper lens with a drop of liquid to the underside of the slide.

The purpose of the immersion liquid with an objective is to save and secure the entrance into the objective of the greatest number possible of the rays which come from the object. When the light passes from the cover glass into the less dense medium air it is refracted away from the perpendicular, and much of it therefore never enters the objective. If now the front combination be connected with the cover glass by a drop of liquid having approximately the same optical density as the glass itself, this dispersion does not occur and the rays are saved to take part in the formation of the image.

The immersion liquid should not be dropped upon the slide, but a small drop should be placed on the front lens with the aid of a small stick of soft wood. (A glass rod should not be used because of the danger of scratching the lens.) The body is then racked carefully down while the observer looks between the objective and cover glass, until connection is just made with the latter by the film of liquid. The focusing is then complete by means of the fine adjustment.

Interpretation of Results.—The observer must not only be able to see with the microscope, but he must be able to interpret correctly what he does see. To be able to do this he must familiarize himself with the appearance of a great many common substances, and especially with those which are likely to find their way accidentally into microscopic preparations, such as air and oil bubbles fibers from the clothing, hairs, etc., etc.

One of the appearances which may sometimes attract the attention of the student is that of *pedesis*, or the *brownian movement*. This is an up and down, or dancing, motion which takes place when certain fine inorganic particles are suspended in a liquid. They have sometimes been taken by incautious observers for living organisms in motion.

Another phenomenon which sometimes puzzles the amateur to explain is due to the presence of an imperfection in the eye, and appears in the form of nearly transparent specks or patches which seem to move rapidly across the field of the microscope when the illumination is bright, and there is no object in view. These specks are really due to the presence of floating bodies in the vitreous humor of the eye, and are thus projected into the field of vision. They may best be seen on a bright day by looking at a clear sky, or a white surface. Technically these objects are known as *muscae volitantes*.

In observing the motions of bodies under the microscope, it must be remembered that motions are magnified as well as bodies. For this reason the motions of a given object will seem much greater under a high power than with a low one.

Care of the Microscope.—All parts of the microscope, especially the optical parts, should be kept free from dust

and dirt. When not in use the objectives should be kept in the brass boxes provided for them, or covered by a screw cap. When dust or dirt is to be removed, it should be done with soft chamois, silk, or well-worn linen. Objectives should be handled with especial care, since they are composed of soft glass, and are easily scratched by gritty particles of dust. Usually the best method of cleaning an objective is to breathe upon it and then rub it gently with soft linen or with the Japanese lens paper supplied by dealers in microscopes. If an oily immersion liquid has been used, it can be removed by wetting the paper or linen with benzol and passing it lightly over the surface. The benzol should never be poured on the end of the objective, as it may penetrate between the lens, and soften the cement of the mounting.

As a rule staining liquids, and other reagents should not be permitted to come in contact with the microscope, and when they do so through accident, should be immediately removed. In removing Canada balsam, shellac, etc., from the brass portions of the stand, benzol, turpentine or chloroform may be applied with a moistened cloth and immediately wiped off before it has time to soften the lacquer or varnish with which these portions are covered. Alcohol is an especially good solvent for the resins of the lacquer, and hence should be used cautiously as a cleaning agent.

Written for the Era.

OLD MORTARS AT SOUTH KENSINGTON.

England's principal museum of Decorative Art contains a collection of mortars, which, if a little scattered, is most varied and comprehensive. The octagonal mortar shown in Fig. 1 is to be found in the "Cross

Locumtenentis," around the lip, while other wording round the base informs us it was made by Giulucius Francisci of Fabriano (Umbria) in 1468. The Museum paid £24 for this relic—it is only $4\frac{1}{2}$ inches high, but richly decorated. Fig. No. 3 is about the same size, but has a spout; around the rim is inscribed the maker's name and the date, 1515—"Opus Juliani Mariotti Florentini, MCCCXCV." The mortar shown in Fig. 4 is dated 1511, and there are about twenty more, which were bought in 1889 for \$1,500 the lot. Most of them are small, but handsome specimens of Renaissance art; the inscriptions are too numerous to be quoted here. Their low, wide shape distinguishes them from the high and narrow

GOthic MORTARS

of which a most remarkable specimen is shown in Fig.



Fig. 1.

gallery," devoted to Oriental Art. It is Persian and is supposed to date from the tenth or eleventh century. It should be noted that this was the epoch when pharmacy flourished in Oriental lands, and the Arabs founded the famous school of Salerno.) Elaborately chased with Kufic inscriptions and arabesques, it is about five inches high; the ring is suspended from a bull's head. It was found in the ruins of the city of Rhages. Close by is another Persian mortar of much later date (about 1500). This approaches the modern cylindrical form, but has a curious three-inch flange round the top and base, adorned with flowers and arabic inscriptions.

THE ITALIAN MORTARS

in the North and South Courts are worth a visit. Some are over 500 years old. The mortar shown in Fig. 2 bears the inscription: "Domini Liberotti de Manasseis Lewy Doctor Interanenensis Generalis Marchie Aconitane



Fig. 2.

5. The crucifixion and Virgin and child are surmounted by Gothic canopies, and the mortar, about eight inches high, is in bronze, and dates from 1400 or 1450.

Another German mortar is inscribed "Diebold Saepelin und Mari Madelena Staefueria, 1644," which would lead one to suppose that it was cast to celebrate a marriage or betrothal; while Dutch art is represented by a handsome mortar (bought for \$125) which announces, "Henrick ter Horst Me Fecit Devotivae Anno, 1641."

THREE LARGE ENGLISH MORTARS

in the loan collection, are the property of Mr. Fitz Henry. They are quite plain, but the quaint inscriptions are worth recording:

1. Thomas Casle
Edvard Neale Made Me, 1657.
2. I Was Made For Francis Keble, 1659.
3. William Carter Made Me For George Boore, 1615



Fig. 3.

The only English mortar noticeable in the permanent collections is a little specimen barely four inches high, evidently

A RELIC OF THE TUDOR PERIOD.

as it bears on each side the Tudor rose surmounted by the Royal crown. It would be interesting to trace its history. Henry VIII. dabbled occasionally in the healing art, if we are to believe certain Ms. in the



Fig. 4.

British Museum. Is it not possible that this tiny but artistic object was intended for the personal use of the burly and many wixed autocrat?

PERFUMERY FOR PHARMACISTS.

In ancient times the manufacture of perfumes was part of the apothecary's art (Excerpt, XXX, 23-25 O. V.). During the present century it has become a special business, and pharmacists, who, by reason of their superior knowledge of organic chemistry, are specially fitted to prepare perfumes, have as a rule been content to simply buy and sell ready-made perfumes on the same footing as the hairdresser, draper, stationer, or general store, instead of preparing special perfumes as proprietary articles of their own, and thus increasing their profits. This knowledge of perfumes is gradually being reduced to science, and it behooves the pharmacist not to neglect this collateral source of income but to keep himself abreast of the progress that has been made. For a time essential oils were regarded as almost simple bodies, and as it was almost impossible to ascertain their identity except by such rough tests as their odor, and their solubility in alcohol of definite strengths, there were few chemicals so much sophisticated as the essential oil. It is even now not many years since it was practically impossible to obtain really pure otto of rose or essence



Fig. 5.

of lemon, and the purer grades of the latter were known as "perfumes."

Recent researches have shown that the volatile oils are in reality very complex bodies, and that the different odors are normally present in definite proportions and can be separated by fractional distillation, freed from or by the use of chemical reagents, and consequently definite standards of purity have in many cases been adopted. Some of the constituents have been found to occur in many different oils, in which their odors are modified by the presence of small proportions of other constituents. It has been observed that perfumes may be arranged in groups, in which the type is thus variously modified. The odor of the rose is evident in the Damask, Maréchal Niel, Gloire de Dijon, General Jacquemint, Maiden's Blush, and other roses, yet each differs from the other in odor. The flowers of *Paeonia alba*, the leaves of *Ginger grass*, and of the rose geranium have all an odor of rose. Wherever this odor is found in plants it is more or less modified by other odors. It is the same with nearly every other plant perfume in nature. It is by imitating nature, therefore, that

his particular that the most satisfactory results are obtained. In other words, every perfume made to imitate the fragrance of any flower must have a basis, and the perfumes that are auxiliary must not be so strong as to overpower it. Odors are like musical notes—they can be combined in an infinity of ways. Artificial perfumes which do not convey the scent of any flower in particular should have a somewhat different character. In them no special odor should be recognizable; they should possess sweetness and diffuse an agreeable but not oppressive odor, and should leave a lasting fragrance when evaporated.

The chemical examination of essential oils has confirmed the above view. The fractional distillation of essential oils is obtained from plants as shown that they consist of a nearly odorless vehicle, which usually consists of one or more hydrocarbons of the terpene class, a principal odorous constituent which may be an alcohol, phenol, aldehyde, ketone, ether, or ester, accompanied by small quantities of various compounds which have not all been yet determined. These modifying constituents may vary even in different parts of the same plant. Thus cinnamon bark oil contains cinnamic aldehyde, eugenol, and phellandrene; cinnamon leaves contain in addition anil, and cinnamon root oil camphor. Oil of cassia, which also contains cinnamic aldehyde, owes its different odor chiefly to the presence of the ester, cinnamyl acetate.

These differences in the varieties of essential oils of commerce must be borne in mind in mixing perfumes, and care be taken that one commercial variety of oil is not substituted for another. It is also necessary to remember that the amount of the principal ingredient in essential oils often varies. In some cases this is due to the fact that in distilling a large quantity of oil, the earlier and therefore more volatile products are not mixed with the later distillates so as to secure uniformity, and sometimes for less satisfactory reasons. In any case the normal amount of the principal odorous ingredient has been carefully ascertained by chemists, and essential oils can now be obtained with a guarantee as to the proportion present. There have also been introduced into commerce a number of essential oils which have been deprived of their vehicle or terpene by distillation in vacuo or other means, and are known as terpeneless oils. The principal odorous ingredient of these oils can also be obtained in a comparatively pure state from the oil by chemical means or by freezing. These are not as a rule so satisfactory as the terpeneless oils, which usually contain in addition the modifying constituents present in the natural oil. This is the case that it has been found necessary to still geraniol or rhodinol oil rose leaves to give it the odifying constituents, when the geraniol has been derived from other sources than the rose. The same is the case with the oil of lemon; citral, its chief constituent, does not wholly represent the flavor of the fresh lemon, and the terpeneless oil is therefore preferable. The chief advantage of employing the terpeneless oils is that they are more likely to be free from adulterants than the natural oils.

In artificial perfumes the natural law is followed. The hide used is generally grape spirit for the finer class of perfumes, as it is less apt to contain traces of any of the offensive alcohols. If in imitation of a flower, the essential oil of the flower, such as orange blossom, is used, if procurable, but in such cases as the violet, jasmine, and a few others, from which the volatile oil cannot be procured by distillation, an artificial product is substituted; a list of these is given below. If the odor itself is faint or easily passes off, a degree of permanence is given by the addition of a very small quantity of a persistent substance. In some cases where the leading perfume is naturally sweet, as in rose or honeysuckle,

an aromatic persistent substance is added, or in cases where the leading odor is aromatic the persistent substance must give sweetness. In the former case, the lasting aromatic odor is given by one or more of the following: ladanum, cloves, patchouli, vetiver, sandalwood, almonds, vanilla, tonka bean, verbenia, and ylang-ylang. In the latter case, liquid storax, musk, otto, bergamot, civet, ambergris, and ambrette or musk seed are the substances chiefly employed. In many cases a tincture is preferable to a separate product, since a small amount of resinous matter tends to make the perfume more lasting. In using the more powerful odors, such as patchouli, almonds, cloves, verbenia, etc., it is best to use a dilute solution of the oil, so as to add a very little at a time, until the required modification of the principal odor is effected.

In endeavoring to imitate a flower or a perfume, the best time to analyze the constituents by means of the sense of smell is in the morning after being in the open air. At that time of the day the olfactory nerve is more sensitive and the difference in odor more readily perceived. To ascertain the mixed odors in a flower, the curious physiological law must be taken advantage of, viz., that it is possible to tire some of the minute terminations of the olfactory nerve—just as those of the eye—so that after fixing the eye upon one color for some time, the eye becomes temporarily blind to it and can only see the complementary colors. Thus, after smelling a flower for a few seconds, a different odor is perceived. In the wallflower an odor resembling cassia flowers (*Acacia farnesiana*) is first perceived, then an odor of tonka beans, then a violet odor and an aroma recalling faintly that of cloves. Or in smelling heliotrope, the odor recalls at first that of vanilla and coumarin, and then almonds.

In examining a spirituous perfume a little is rubbed on the back of the hand, and smelt at intervals of a few seconds, inhaling pure air between each interval. In this way after a little practice it will be comparatively easy to detect the constituent odors. Sometimes the addition of a little water to the perfume will render some of the odors more pronounced, or slightly heating the mixture in a test tube and noticing the odors as they are given off, according to their greater or less volatility. It must be further remembered that perfumes in many cases will become mellowed by keeping, and that some aldehydes, like heliotropin and citral, are altered by heat and light or prolonged exposure to air. It may be useful to direct attention here:

1. To the known constituents of some of the principal oils used in perfumery.
2. To some of the more important artificial synthetic perfumes, and
3. To the more recently introduced natural perfumes.

1.—PRINCIPAL OILS USED IN PERFUMERY.

BERGAMOT.—The chief constituents are linalool and acetate of linalool.

BAY (*Pimenta acris*).—Citral, methyl-chavicol, chavicol, methyl eugenol, eugenol.

CASSIA.—Cinnamic aldehyde and acetate of cinnamyl.

CINNAMON.—Bark: Cinnamic aldehyde and eugenol. Leaves: In addition, saffrol, a larger proportion of eugenol, and benzoic acid. Root: In addition, camphor.

CITRONELLA.—Citronellol, geraniol, and methyl-heptenone.

CLOVE.—Eugenol, furfural, amyl, methyl-ketone.

GERANIUM OIL, Indian or Turkish: Geraniol, geranyl acetate and capronate, methyl-heptenone.

ROSE GERANIUM OIL.—Geraniol, geranyl tiglate, and citronellol.

LAVENDER.—Linalool, linalyl acetate, geranyl acetate, and cineol.

LINALOE.—Linalool, geraniol, methyl-heptenone.

LEMON.—Citral, citronellol.

NEROLI.—Linalool, linalyl acetate, geranyl acetate.
ROSE.—Geraniol, citronellol.
ROSEMARY.—Cineol, camphor, borneol.
SANDALWOOD.—Santalol and santalal.
VERBENA.—Geraniol, citral, methyl-heptenone.
YLANG YLANG.—Linalool, geraniol, and their acetate and benzoate esters, para-kresol-methyl-ether.

It will be seen from the above list that many of these oils contain the same constituents, but, of course, in different proportion, and this suggests the idea that many other combinations might be formed artificially. It may be noted here that the odor of Russia leather in perfumes is given by the empyreumatic oil of *Betula alba*, but a purer odor could probably be obtained by heating betulin, the crystalline principle contained in it.

2.—SYNTHETIC PERFUMES.

ANISIC ALDEHYDE.—Known commercially as "Anisepine." It possesses the odor of hawthorne flowers, but requires mixing with other odors to render it agreeable.

BENZYL CINNAMATE. has the odor of balsam of Peru.

BORNYL ACETATE has the odor of fir trees.

CARYACROL has a thyme-like odor.

CINNAMYL ALCOHOL has an odor of hyacinths.

CITRAL OR GERANIC ALDEHYDE has the odor of lemon, and is more readily soluble in alcohol than essence of lemon.

CUMARIN has the odor of new-mown hay.

EUGENOL has the odor of cloves.

GERANIOL.—Also called rhodinol and limonol. It has the odor of rose. Geranyl acetate has a lavender odor; geranyl formate is also made.

IOXONE.—A ketone obtained from citral. It has a very powerful odor of violets.

LINALOOL AND LINALYL ACETATE have an odor between that of bergamot and French lavender. The latter is the "Bergamot" of commerce (Schimmel). Linalyl formate resembles the odors of petitgrain and bergamot.

METHYL BENZOATE.—The "oil of Niobe" of commerce.

METHYL SALICYLATE.—Artificial oil of wintergreen.

SAFFROL has the odor of saffron.

SALICYLAL OR SALICYLIC ALDEHYDE has the odor of meadow sweet.

TERPINEOL has the odor of lilac.

VANILLIN has the odor of vanilla.

There are also to be met with in commerce the synthetic oils of jasmine and neroli (Schimmel), and artificial musk (Baur).

3.—RECENTLY INTRODUCED NATURAL PERFUMES.

CANADA SNAKE ROOT OIL.—*Asarum canadense*.
CHAMPACA OIL. (Schimmel).—*Michelia champaca* and *M. longifolia*. Has an aromatic odor.

CHAMPACA OIL. (Haenschel).—Gaiacum wood oil, Schimmel derived, according to Haenschel, from *Balesia sarmientii*, Lorenz. Used with otto of rose to give the odor of the tea rose, etc.

COSTUS OIL.—*Apilotaxis auriculata*. It has a violet odor.

FREJAR OIL. (Haenschel). Botanical source unknown.

KETOMOL OIL.—*Lindera sericea*. Has a pleasant, spicy odor.

LADANUM OIL.—*Cistus Creticus*, very persistent odor, somewhat like ambergris.

NAGKESAR OIL. (Haenschel).—*Mesua ferrea*. Odor of a violet character.

NIGELLA OIL.—*Nigella damascena*. It has an odor like raspberries.

OPOMONAX OIL.—*Balsamodendron kafal*. Obtained from the gum resin (Bissa-bob). Odor somewhat aromatic.

PERU BALSAM has the color of the balsam, but less empyreumatic.

SANDALWOOD OIL, AFRICAN. has an odor resembling sandalwood.

SITCEWOOD OIL.—*Laurus Benzoin*. Odor somewhat spicy.

STORAX OIL has the odor of liquid storax.

TOLU BALSAM OIL has a hyacinth odor.

Numerous oils available for ordinary essences are also now procurable in commerce, e. g., angelica, basil, celery, cherry-laurel, marjoram, parsley, parsnip, sage, summer savory, tarragon, thyme, walnut leaves, etc.

Those who have sufficient chemical knowledge to form new esters from aromatic acids and various alcohols will find a wide field of possibly new perfumes before them. (*Pharm. Jour.*)

(Special Correspondence of the Era) FROM THE FRENCH CAPITAL.

Paris, March 7, 1898.

Although the influenza epidemic is practically over, pharmacists are still busy, for the weather is changeable and trying. Other business seems less brisk, a fact attributed by some to the crisis through which we have just passed. The only point about the Zola trial, however, to which I need allude is the severe way in which

M. Grimaux.

chemistry professor at the Polytechnic School, has been dealt with for giving evidence on behalf of the defendant. Although it was perhaps unnecessary and useless for this savant to come forward in a heated and semi-political arena, the sympathy which he met with at the Academy of Sciences and the Society of Biology shows that his fellow-scientists consider him hardly treated. The fact of the pupils of the Polytechnic School being mostly destined to military service, and therefore "anti-Zolaists," may just be noted.

The Prosecution of "Cutters"

for breaches of the pharmacy laws is usually carried out by local syndicates. The most important case of this kind—the Paris Pharmacists' Syndicate vs. Poirson—ended last year in the conviction of the latter. Just recently, the "Grande Pharmacie de France," at St. Etienne, which is practically, if not nominally, the property of M. Poirson, has been attacked for supplying inferior drugs. The magistrate postponed judgment.

At La Châtre, the local syndicate failed to prove that a cutting pharmacy was run by a person who was not the real owner; and they had to pay damages to the defendant.

In both these cases information seems to have been given against the "cutters" through spite, by jealous relations or discharged assistants. Syndicates learn by experience that this class of testimony needs rigorous confirmation before prosecution can be safely attempted. Meanwhile,

The Anti-Cutting Scheme

is not neglected. Fifty-one proprietors of patent medicines have expressed their willingness to adhere to the "ticket system" for selling at marked prices. Each is to sign 9000 circulars—one for each of our "pharmacians"—and hand them to the General Association of French Pharmacists. The Association will distribute the half million signed sheets—51 to each pharmacist—with a request to sign the form attached and return same. This individual contract between each pharmacist and each manufacturer is considered necessary in order to avoid the law against combinations and "trusts" for keeping up prices.

M. Collard.

the eloquent leader of the Southern League, which so strongly opposes any compromise with the "patent medicine men," is one of the best known faces at the stormy "anti-cutting" meetings, of which I fear we have not



M. COLLARD.

yet seen the last. At the Brussels Congress as at the Paris School of Pharmacy, he is ever to the fore on this subject—courageous and consistent if not always successful.

Recently he addressed the students at the Montpellier School of Pharmacy on the reforms which it was desirable to introduce into French pharmacy legislation. It is felt that now the general election is approaching, pharmacists and their well wishers should seize the occasion to impress upon candidates the expediency of making a bid for the pharmaceutical vote by pledging themselves to do their best to urge on the new Pharmacy Act.

"Substitution?"

M. Petit, the leading Paris pharmacist who presides over the General Association, has been prosecuted by Messrs. Brigoumet & Naville for supplying methylacetamide to a customer who asked for "Exalgine." The two substances, M. Petit objected, are identical, but Messrs. Brigoumet claim exclusive right to the name "Exalgine."

The Court held that M. Petit ought to have stated that the article he supplied was not the proprietary article asked for, and condemned him to a \$20 fine. M. Petit intends to appeal. He wants to show up the way in which this right to a scientific name (which ought to be public property) is abused. He has published pamphlets and made numerous speeches on the subject, while several resolutions have been passed (at Paris, Rouen, and Brussels pharmaceutical gatherings) in support of his idea that the name of a medicament should not be allowed to become a monopoly.

A Centenary.

Bayen, the military pharmacist, died on Feb. 15, 1798. He was "chief pharmacist of the King's armies" from 1769 to 1789, and "inspector" (head) of military pharmacists under the Republic from 1792 till his death. He discovered new methods of water analyses, commenced the attack on the "phlogistic" theory by his researches on mercury salts; isolated oxygen; studied marbles and other stone and laid the scientific bases of mineralogy; established the harmlessness of pewter for drinking and other vessels, besides numberless smaller researches.

He did much to reform the sanitation of military hospitals—very nests of infection and gangrene 130 years ago, and on more than one occasion carried wounded soldiers on his own back off the field of battle. It is proposed to place a commemorative tablet on the house he occupied in Paris during the latter years of his life.

Here and There.

At the Academy of Sciences, M. Carnot, chemistry professor at the School of Mines, explained his new method—rapid, simple and exact—for the separation and dosage of iodine, bromine, and chlorine in haloid salts.

M. Carles, who keeps the "British Pharmacy" on the quay at Bordeaux, and has published numberless notes on the analysis of wine, has turned his attention to the mustard pot, and warned us of the danger that lurks in leaden capsules when the cork is thrown away, as it so often is. French mustard contains vinegar, the fumes act on the capsule and form acetate of lead. Colorless and sweet, it may drop into the mustard and be eaten without suspicion. The mustard pot should always be closed by cork, etc., never by the capsule.

PHARMACY.

CREOLALBUM is a synonym for crealbin, a creolin-albumin compound for internal use.

COLD CREAM COLORS.—For lilac use dilute solution of methyl violet; for green employ chlorophyll.

QUININE IN SUPPOSITORIES, in half grain or gram doses, is recommended when it cannot be given by the mouth.

HEPARADEN.—A remedy for jaundice introduced in France, consisting of 2 parts of fresh liver and 1 part of milk sugar. (Südd. Ap. Ztg.)

SACHET POWDER.—The following is recommended: Orris root 500 p., powdered rose leaves 200 p., tönca beans 100 p., vanilla 10 p., musk 1 p., and heliotropin 3 p. (Drog. Ztg.)

GOSSYPOL.—A crystalline substance obtained by Marchlewski (Chem. Ztg.) from cotton seeds. It resembles the tannins both in chemical properties and physiological action. (Ph. Post.)

TEGMIN is a new surgical dressing, recommended particularly as a protective covering during vaccination. It is an emulsion of yellow wax (1 p.), acacia (2 p.), and water (3 p.). (Südd. Ap. Ztg.)

COLCHISAL or colchicine salicylate, is a yellow, amorphous powder, soluble in water, alcohol and ether. It is a remedy for arthritis, rheuma and gout, in doses of 0.00075 gm. (1-100 grain).

GYMNEMIC ACID is used by Dr. v. Oefele to render the organs of taste insensible to bitter, sweet, or other substances. It is applied in 1 per cent. solution on the tongue, with a brush. (Ph. Post.)

BICYCLE VARNISH.—Heat to boiling 4 p. linseed oil and add 8 p. amber, 1½ p. asphalt, and 1½ p. resin. After complete fusion of the mixture, take it from the fire and add 8 p. oil of turpentine. (Ph. Post.)

GLYCOBLASTOL, a hair remedy, is a yellow liquid of agreeable odor, containing, according to Dr. Weller: Alcohol 35.22, glycerin 61.64, and 0.19 per cent of a substance resembling cardol, having a very pungent taste, probably capsaicin. (Ph. Rundschau.)

SINAPOL.—A mixture recommended as an external application for headache, neuralgia, rheumatism, etc.:

Spirit of camphor (1:15)	780 gm.
Castor oil	120 gm.
Menthol	30 gm.
Essence of mustard	30 gm.
Aconitine	0.4 gm.

(L'Union Ph.)

WAX FOR WIGS.—Melt together at a low heat 565 p. resin, 170 p. turpentine, 85 p. tallow, 170 p. white wax, and 17 p. oleum resin. Mix well and add to the partially cooled mass 56 p. powdered starch, previously triturated with 5 p. balsam Peru. (Ph. Ztg.)

MOUTH WATERS AND LIP ECZEMA.—A. Neisser (Ther. Monatsh.) states that mouth washes and tooth preparations containing essential oils, particularly peppermint and clove, should not be used by persons troubled with lip eczema, as they retard their healing. (Ap. Ztg.)

WHITE TOOTH POWDER WHICH BECOMES RED WHEN MOISTENED, is prepared by the following formula: Cream of tartar 100 p., magnesium carbonate 20 p., calcium carbonate 60 p., cochineal in fine powder 3 p., alum 6 p., rose oil q. s. Mix thoroughly. (Drog. Ztg.)

TRITOL.—E. Dieterich recommends diastatic extract of malt as an emulsifying agent for oils and calls emulsions made in this manner "tritols." One part of extract is required for 4 parts of oil. Pancreatic juice and pancreatine also form perfect emulsions with cod liver oil. (Jour. de Ph. et Ch.)

OINTMENT OF YELLOW OXIDE OF MERCURY.—Dr. Schanz recommends the following formula: Mercuric oxide 0.1 to 0.2 parts, woolfat 1 part, distilled water 1 part, white vaseline 10 parts. This ointment is claimed to mix readily with the conjunctival fluid and does not become rancid. (Ap. Ztg.)

ANTISEPTIC PENCILS are prepared by L. Adrian (Ann. de Ph.) as follows: Corrosive sublimate 1p., tale 50 p., tragacanth 3 p., distilled water and glycerin, a sufficient quantity. The place of corrosive sublimate may be taken by boric acid, iodoform, carbolic acid, salol, iodol, ichthylol, etc. (Ap. Ztg.)

CINNAMIC ACID IN TUBERCULOSIS.—The salts of cinnamic acid have been employed by Prof. Landerer in Stuttgart as a remedy for tuberculosis with more than 400 patients, during a period covering seven years. The observations apparently justify the hope that the remedy will effect cures in many cases. (Drog. Ztg.)

BISMUTAN.—A canary-yellow, odorless powder, insoluble in water, consisting of bismuth, resorcin and tannin. It is recommended for intestinal catarrh in doses of 0.5 to 1 gm. (8 to 15 grains) for adults; for children in teaspoonful doses of a mixture containing 1.5 to 2.5 gm. (23 to 38 grains) in 100 gm. (3 troy ounces). (Südd. Ap. Ztg.)

BRENZCAIN, or guaicol benzyl ester, is free from the caustic action of guaicol and is used for producing local anesthesia by means of cataphoresis. The compound occurs in crystals, which are soluble in alcohol and ether. It combines readily with vasogen, with which it is diluted in the same manner as other guaicol preparations. (Ph. Post.)

INCOMPATIBILITY OF CAFFEINE HYDROCHLORIDE WITH SODIUM BENZOATE AND SALICYLATE.—Attention is called in "L'Orsini" to the fact that caffeine hydrochloride readily liberates hydrochloric acid on contact with water, alcohol, or the air. When it is present in mixtures containing either of the above sodium salts, the hydrochloric acid liberated will displace from combination, and throw out of solution, a corresponding quantity of benzoic or salicylic acid. It is therefore recommended to employ the free base caffeine in preference to the hydrochloride, for subcutaneous injections also containing sodium benzoate. (Ztsch. f. Ph.)

AQUA CALCINATA EFFERVESCENS is a soda water containing considerable quantities of calcium carbonate and salicylate in solution. It is claimed to be of value in inflammatory disturbances of the stomach and intestinal canal, and is placed on the market in two strengths, 1 containing 2 gm. of each salt per liter, the other 4 gm. of carbonate and 3 gm. of salicylate. (Südd. Ap. Ztg.)

SILVER SULPHOTHIENATE is best prepared by the interaction of silver carbonate and sulphophenic acid in the following manner. The acid is diluted with water, heated in a capsule on a waterbath, and finely powdered silver carbonate added in small quantities until the acid is neutralized. After filtering the solution it is concentrated and set aside to crystallize. The salt must be protected from the influence of light. (Jour. de Ph.)

FERRALBUMOSE is prepared, according to Dokkum (Ph. Weekbl.) from meat, which is cut fine, after depriving it of fat, then treated with artificial gastric juices, the filtered solution freed from albumin, neutralized with sodium carbonate, again filtered and evaporated to dryness in vacuo. Of this albumose a 10 per cent. solution is made and a 10 per cent. ferric chloride solution added so long as a precipitate is formed. The precipitate is dried, powdered and sifted. (Ap. Ztg.)

PROTARGOL IN EYE PRACTICE.—It is proposed by Darier to replace silver nitrate by protargol in the treatment of eye diseases, as it is non-irritant and painless, and has considerable bactericide power. Further advantages lie in the facts that its solutions are not precipitated by alkalis, albumins, or sulphur compounds, and that it is readily combined with cocaine. Darier recommends it in solution and in ointment, according to the following formula: Protargol 1.5, zinc oxide 1, starch 1, vaseline 15 parts. (Ap. Ztg.)

AN ODORLESS DISINFECTANT FROM UREA AND FORMALDEHYDE.—Through the action of formaldehyde in excess upon urea in alkaline solution a precipitate is formed, which is an addition product of one equivalent of urea and two of formaldehyde. The precipitate is collected, washed with cold water and dried. It is a white powder, insoluble in alcohol and ether, soluble in hot water with partial decomposition. In the air it slowly loses formaldehyde. (Südd. Ap. Ztg.)

AGAR-AGAR AS OINTMENT BASE.—In Wr. Med. Pr., this gelatinous substance, also known by the name "Gelatina (Chinensis) Tjen-Tjan," is recommended as a basis for mixtures of substances that are readily decomposed when combined with fatty bodies. For treatment of erysipelas, e. g., the following combination is employed: Agar-Agar 1 p., mercuric chloride 0.1 p., tartaric acid 0.1 p., and water 100 p. This forms a jelly, which is pressed in small pieces upon the affected parts. It dries rapidly to a film and is readily washed off. (Ap. Ztg.)

COD LIVER OIL WITH BENZOATE OF IRON.—C. de Groot (Ph. Weekbl.) found that slowly dried ferric benzoate is not readily soluble in cod liver oil and suggests the following improvement. Ferric chloride is precipitated with sodium benzoate, the precipitate washed with cold water, then drained with a filter pump and mixed with enough anhydrous sodium sulphate to make a fine, dry powder. This is shaken for some time with cod liver oil, kept at 30° to 32° C. The iron salt readily dissolves, while the sodium sulphate remains suspended, but settles to the bottom after standing a while, when the clear oil may be decanted. The preparation thus made is usually of lighter color than the commercial products. (Ap. Ztg.)

OIL OF EUCALYPTUS TO REMOVE VERMIN FROM POULTRY.—This oil has been found an efficient means of driving insects from the nests of chickens and pigeons through its powerful odor which, however, has no deleterious effect on the health of the birds or their young. The method of operation recommended is to perforate an egg at each end, blow out the contents, and introduce a small sponge, which has been well dried and then saturated with oil of eucalyptus. The holes are closed with wax and the egg placed in the midst of those in the nest under the setting hen, where it remains during the entire period of setting. The vapors of the oil emanating through the pores of the shell are sufficient to drive away all vermin infesting the nest within a few hours. (L'Union Ph.)

OXYCYANIDE OF MERCURY IN SURGERY.—For the past three years Dr. Verneuil, of Brussels, has been using a solution of oxycyanide of mercury in hospital service, for washing wounds and disinfection of instruments. This salt has the advantage that it does not attack steel instruments. It affects only aluminum, but since this is little used, this fact is of little importance. The solution recommended contains 1 gm. of the salt per liter, and is colored with picric acid. It may be substituted for the customary corrosive sublimate solution in all surgical uses. Precaution must be taken not to confound the oxycyanide with cyanide of mercury, as the latter is unstable, and frequently contains cyanate, which is even more injurious to instruments than corrosive sublimate. (L'Union Ph.)

THE CARBONIC ACID SPRING IN SONDRÄ is looked upon as a result of volcanic action, which took place in the region of the Thuringian Forest during the tertiary age. The pressure of 17 atmospheres at the mouth has never diminished and the supply of acid seems to be unlimited. When the opening is closed by means of a system of valves, the gas is used as a source of power for an illuminating plant and for the machinery used in liquefying the acid. The spring yields about 1,000 cubic yards of the gas per hour. As it issues from the earth it contains 99 per cent. of carbon dioxide, the remainder being nitrogen, which is removed by passing the mixed gases into water under high pressure, displacing the nitrogen with pure carbonic acid and liberating the purified gas under low pressure. The capacity of liquid carbon dioxide of this plant is over 10 tons in 24 hours. (Südd. Ap. Ztg.)

HOW TO REPRODUCE OLD PRINTS.—The following is the process employed in a Paris concern that makes a specialty of lithographic fac-similes of old and rare prints (which fac-similes are sold as genuine antiques): Prepare a bath as follows: Sulphuric acid, 3 to 5 parts (according to the antiquity of print, thickness of paper, etc.); alcohol, 3 to 5 parts; water, 100 parts. In this soak the print from five to fifteen minutes (the time depending on age, etc., as above), remove, spread face downward on a glass or ebonite plate, and wash thoroughly in a gentle stream of running water. If the paper is heavy, reverse the sides, and let the water flow over the face of the print as well. Remove carefully and place on a heavy sheet of blotting paper, cover with another, and press out every drop of water possible. Where a wringing machine is convenient and sufficiently wide, passing the blotters and print through the rollers is better than mere pressing with the hands. The print still moist is then laid face upward on a heavy glass plate (a marble slab or a lithographer's stone answers equally well), and smoothed out. With a very soft sponge go over the surface with a thin coating of gum arabic water. The print is now ready for inking, which is done exactly as in lithographing, with a roller and printer's or lithographer's ink, cut with oil of tur-

pentine. Suitable paper is then laid on and rolled with a dry roller. This gives a reverse image of the print, which is then applied to a zinc plate or a lithographer's stone, and as many prints as desired pulled off in the usual lithographing method. When carefully done and the right kind of paper used, it is said that the imitation of the original is very perfect in every detail. (Nat. Dr.)

KITCHEN GRATERS IN THE SERVICE OF PHARMACY.—An ordinary grater, as is commonly used for grating horseradish, is a very useful and convenient utensil in the pharmacist's laboratory for powdering camphor, cacao butter, almonds, etc. Camphor is in this manner powdered much more readily than can be done by trituration in a mortar with addition of alcohol or ether. The powder, although coarse, is light, uniform, and does not "cake," which it usually does when powdered in a mortar. This coarse powder can easily be made finer by trituration in a mortar, if desired. The coarse, grated camphor is best for rapidly making solutions in oil, ether or alcohol. For the preparation of suppositories by compression, the grater is useful as a means of comminuting the cacao butter. In warm weather the fat should not be touched with the hands, but softening prevented by handling with bibulous paper. Much time is saved by the use of the grater in the preparation of almond mixture. Stearin, paraffin, spermaceti are other substances quickly powdered with it. (Südd. Ap. Ztg.)

NOTES ON PERFUMES.—Dr. Th. Koller makes some interesting observations on the blending of odors in "Xenste Erf. u. Erf." A great variety can be produced in extremely simple manner and entirely new odors can be formed by suitable admixture and treatment of various substances. A mixture of balsam Peru with traces of carbolic acid closely resembles castor in odor; acetic ether with traces of oil of clove has the odor of fresh strawberries. The odor of fresh poplar buds is readily reproduced by mixing an alcoholic solution of guaiac with oil of lavender. An alcoholic solution of rose oil with traces of patchouli gives the well known white rose extract. Oil of rose with traces of musk gives a moss rose odor. Lily of the valley is imitated by mixing ylang-ylang extract with traces of tincture of cardamom. Extract of elder flowers is reproduced by mixing oil of turpentine with ylang-ylang and linalool. Eau de Cologne could be prepared by mixing 100 parts of alcohol with 1 part of oil of neroli. A perfume so prepared and stored for some time is acknowledged by every connoisseur to be the best, but it is more expensive than mixtures prepared by the customary formulas, which direct, in addition to minute quantities of neroli, oils of rosemary, lavender, lemon, etc. The very popular perfume, "Essence de Stange," can be reproduced by the following formula: Macerate for one month a mixture of extracts of jasmine, violet, and mignonette, of each 1,000 parts;orris root, 1,500 parts; liquid storax, 5 parts; and ambergris, 2 parts. The English are fond of powerful odors, and therefore often reinforce flower extracts by addition of ambergris, musk, storax, benzoin, coumarin, patchouli, etc. Chemistry has discovered many aromatic substances, as heliotropin, vanillin, nerolin, terpineol, which are now in the market at sufficiently low prices to make it worth while to experiment with them, with a view to making new and agreeable combinations. These substances, dissolved in alcohol and mixed with suitable fixing materials, such as musk, ambergris, etc., make excellent and cheap perfumes. A good formula for heliotrope extract, which makes a preparation of powerful and agreeable lasting odor, is as follows: To 1 liter of alcohol add heliotropin, 1 gm.; vanillin, 0.2 gm.; oil of neroli, 3 gm.; oil of bitter almond, 1 gm.; musk, 0.1 gm.; and benzoin, 5 gm. Macerate for one month and filter. (Drog. Ztg.)

AN ADVERTISING PROBLEM.

L. Levinger, of Baker City, Ore., writes as follows: "I mail you several copies of our dailies in which we carry ads. Circulation of paper is 1,000 and we pay \$8 per month for the space we use. Change every three days or more if we choose. It occurred to me that it might be better to use an ad three times a week instead of a card, and getting thereby preferred space for about the same outlay. The charges in column marked are 5 cents per line for one publication. Think the trouble is, most all advertisements in this paper run right along without a change, and therefore I don't believe the public ever look at ads. Kindly advise me what you consider the best mode of advertising under such circumstances."

Mr. Levinger uses 4 inches single column next to reading matter in two daily papers, but his advertisements are at bottom of column. The prices seem to be reasonable, the papers are well printed and in the face of seeming excellencies the advice to make a change must be rather guarded, and the position is made the more difficult because we have talked long and long about the shortcomings of the printer in setting ads, and lo! here are two newspapers in which the advertisements are set in the most approved style. We shall therefore have to abuse the printer for doing too well. A dozen good ads on a page, all equally well set, all bordered, all ornamented, all about the same size, are suggestive of monotony, and in spite of their individual prettiness they are monotonous. It is quite likely that people do not look at the ads, for if they examined these papers, which are dated January 12 and 14, they would find seven firms still talking about the holidays, and one is still wishing a merry Christmas. This is not the fault of Mr. Levinger, as his advertisements are fairly good. One reads as follows:

"BIRD SEED—Put up in boxes often gets musty and unfit for use. We put ours in bags so that the air is not excluded and it is always fresh. Try a pound of our kind—Only Ten Cents."

There is an interesting point brought out here, and it ought to bring results. The ad should be repeated occasionally, because all the people in Baker City do not need bird seed at once, and their memory must be jogged from time to time. The other advertisement refers to an electric belt, and Mr. Levinger wants people to send for a pamphlet about it. We do not think people will do this. We do not think Mr. Levinger sits down and writes to all the people who offer to send circulars to him about drug store goods. If something were told about the belt—what it will cure—then there might be a few people who would be interested enough to send for the pamphlet. The fault in advertising in Baker City seems to be pretty fairly placed on the advertisers.

In the case of Mr. Levinger, we believe he might attract attention to his advertising by putting a little more reading matter in them to contrast with the other advertising which has a great deal of white in it. Very little of the advertising is of the informing kind, and very little of it quotes prices. Whether a change from daily to three times a week is a good one can only be decided after a trial. If a better location can be secured it might be a good idea to enlarge the space for the tri-weekly advertisements, and as people of Baker City have perhaps got tired of seeing old ads or reading about Christmas presents in the middle of March, it may take some pretty strong advertising to make them see that something is actually "going on" in the Levinger advertising. Novelty should be pushed as attracters of both newspaper attention and trade. Even things or styles which we might at other times condemn as "fracky" are sometimes necessary to get newspaper readers into the habit of noticing the advertising.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Tincture of Steel.

(A. B.) "Tincture of Steel" is an old name for tincture of ferric chloride.

Spirit Thymol Compound.

(J. J. J.) See Era of Feb. 4, last year, page 141. We cannot give the formula for the proprietary preparation.

Oil For Floors.

(C. H. C.) See Era of Dec. 30, 1897, page 1,000. One of the first three formulas there given will probably answer your purpose.

"Unmedicated" Tincture of Iron.

(A. B.) We know of no preparation under this title. If tasteless tincture of iron is meant, you will find a formula for it in the National Formulary.

Vapo-Cresolene.

(J. J. J.) Vapo-cresolene is a trade-marked preparation recommended in the treatment of whooping cough and kindred diseases. We cannot give the formula.

Face Paint to Imitate Freckles.

(C. S.) "Spot" the actor's face with a little burnt amber worked up in the same fatty base you employ for making face paints. Several adhesive substances may be suggested, but the above will probably answer.

Elixir Lactated Pepsin.

(H. L. S.) The National Formulary offers a formula for an elixir containing pepsin with lactic acid; see Compound Elixir of Pepsin in that work. Additional formulas may be found in the issues of this journal, June 17, 1897, page 722, and December 9, 1897, page 879.

Russia Salve.

(F. E. R.) Fenner is authority for the following formula: Take equal parts of yellow wax and sweet oil; melt slowly, carefully stirring; when cooling stir in a small quantity of glycerin. Said to be good for all kinds of wounds, etc. We cannot give the formula for the proprietary articles you name.

Dose of Wine of Cod Liver Oil.

(Old Subscriber.) The usual dose of wine of cod liver oil prepared after the formula in this journal, Aug. 19, 1897, page 238, is a tablespoonful for adults, given three or four times a day. With this information as a starting point you can easily figure out the doses for children.

Papayotin.

(J. W. W.) Coblenz in "Newer Remedies" gives the dose of papayotin as 0.12 to 0.3 grams (2 to 5 grains), after meals. Applied as a 5 per cent. solution (in equal parts of glycerin and water) papayotin is used to dissolve the false membranes of croup and diphtheria. As you are probably aware, papayotin is the concentrated, active principle of the juice of the unripe fruit of *carica papaya*. The juice is concentrated in vacuo, and the ferment is precipitated by the addition of alcohol. It is employed as a digestive ferment, and claimed to digest albuminous substances in either acid, alkaline or neutral solutions. Considerable information on this subject may be found in the U. S. Dispensatory.

Lamp Spirit

(M. Y.) "Lamp spirit" is another name for "burning fluid," which at one time was extensively used in lamps having long safety tubes. This preparation has been entirely superseded by kerosene or refined petroleum. For information regarding the composition of burning fluid, see reply elsewhere in this department.

Syrup of Hypophosphites.

(J. H. P.) The formula you submit, containing phosphate of iron, calcium hypophosphite, salicylic acid, etc., is incompatible. We suggest you employ one of the formulas published on page 402 in last week's Era, or, better still, use formula No. 378, National Formulary. This syrup should not be confounded with the official syrup of hypophosphites. It is not intended to be perfectly clear, and should be shaken before using.

Books Containing English and German Drug Names.

(E. A. S.) Hedges' "Polyglot Index" and Rudolph's "Chemical and Pharmaceutical Directory" are books of the character you outline, giving in English, German and Latin the names of most of the drugs and chemicals in common use. Another similar work is Hoffman's "Popular German Names of Domestic Drugs and Medicines." A list of most of the words used by German physicians in prescriptions may be found in the Era Dose Book. Any or all of these works may be obtained through this office.

Solution of Magnesium Citrate.

(W. J. F.) In the earlier issues of the Pharmacopœia of 1890 the quantity of syrup of citric acid directed to be employed in the preparation of solution of magnesium citrate was given as 120 cc. This quantity was by far too great and the error was soon detected. The quantity really intended was 60 cc., which makes the solution sweet enough. This error has been frequently noted in the pharmaceutical journals, and pharmacists who purchased the earlier issues of the Pharmacopœia have corrected them accordingly.

Remedies For Itching Piles.

(W. S.) See this journal Feb. 18, 1897, page 206. Here are two formulas from Griffiths' Non-Secret Formulas:

(1) White wax	1 pound
White petrolatum	2½ pounds
Powdered opium	1 ounce
Powdered hydrastine sulphate	1 dram
Powdered catechu	1 ounce

Melt the wax and petrolatum and add the other ingredients; stir well and mix thoroughly.

(2) Tannin	2 drams
Bismuth subnitrate	2½ ounces
Aqueous extract opium	2½ drams
Petrolatum, yellow	12 ounces

Lysol.

(E. E. R.) Coblenz in "Newer Remedies" gives the following information concerning Lysol: Lysol is prepared from the fraction of coal tar oil which boils between 190° to 200° C., by dissolving it in fat and subsequently saponifying it with the addition of alcohol. It forms a clear, brown, syrupy liquid, containing 5 per cent. of the cresols; it is miscible with water, forming a clear, saponaceous frothing liquid. With all other solvents it is miscible in all portions. Experiments have shown lysol to be five times stronger than carbolic acid in antiseptic power. The strength of the solution employed is usually 0.3, 1 or 2 per cent.

The Manufacture of Compressed Tablets.

(D. & P.) Considerable experience on the part of the operator to work up a given quantity of material is necessary so that the number of tablets shall neither exceed nor fall short of that upon which the calculations are based. Difficulties of this character may be due to one or more of a number of causes. Thus the material employed may have been imperfectly prepared or

granulated, or it may have been dampened a little more at one time than another, or too much pressure may have been employed. We cannot exactly tell why you have failed to secure a given number of tablets from a definite quantity of mixture. We think, however, the trouble may be due to inexperience which a little work will correct. Why not do some experimenting with various tablet mixtures. It might also be a good move to communicate with the manufacturers of your machine.

Tincture Ferric Chloride and Spirit of Nitrous Ether.

(U. S. K.) asks criticism upon the following:

Tincture ferric chloride	2 drams
Spirit nitrous ether	1 ounce
Potassium citrate	1 ounce
Solution morphine sulphate	2½ drams
Syrup, enough to make	3 ounces

Several reactions may occur, depending upon the order in which the various ingredients are brought together. Thus if spirit of nitrous ether be added to the potassium citrate dissolved in the syrup and the latter salt be strongly alkaline or acid decomposition will result. Again tincture of ferric chloride is strongly acidulous and readily decomposes spirit of nitrous ether with formation of gaseous products. The dispenser will also experience difficulty in dissolving so large a quantity of potassium citrate in the liquids of the mixture. We do not think the prescription should be dispensed.

Burning Fluid.

(D. C. P.) asks what is meant by "burning fluid" in the following formula for a liniment:

Burning fluid	
Oil cedar	
Oil hemlock	
Oil sassafras	
Oil origanum	
Ammonium carbonate	

"Burning fluid" was a term applied before the use of refined petroleum for lighting purposes to a mixture of spirits turpentine, camphor and alcohol. According to James A. Webb (this journal, Nov. 18, 1897, page 713) it consisted of a mixture of one part of Webb's camphene and four and a half parts of 95 per cent. alcohol. Spirits of camphor to which a little oil of turpentine has been added will probably answer all requirements in the above prescription.

Aquarium Cement.

(J. R. R.) The Era Formulary gives the following:

(1) Gutta-percha, in shreds	4 ounces
Black pitch	8 ounces
Shellac	2 drams

Melt in an iron ladle on a sand bath and stir together. Pour out on a wet slab and roll into sticks.

(2) Litharge	20 parts
White sand, finest	20 parts
Plaster of paris	20 parts
Borate of manganese	1 part
Resin, powdered	70 parts

Boiled linseed oil, sufficient quantity.

Mix the solids and make them into a paste with the oil.

(3) Take equal parts of flowers of sulphur, powdered sal ammoniac, and iron filings, and mix thoroughly with good boiled linseed oil. Finally, add a sufficient quantity of pure white lead to form a semi-liquid about the consistency of thick molasses.

Chemical Schools and Journals.

(E. H.) The following high grade universities or educational institutions in the United States maintain schools or departments devoted to the teaching of chemistry in all its branches: Harvard University, Cambridge, Mass.; Columbia University, New York City; Johns Hopkins University, Baltimore, Md.; University of Pennsylvania, Philadelphia, Pa.; University of Michigan, Ann Arbor, Mich.; Stevens Institute of Tech-

nology, Hoboken, N. J.; Lafayette College, Easton, Pa.; Polytechnic Institute, Brooklyn, N. Y. There are others.

The American Chemical Journal and the Journal of the American Chemical Society are periodicals of the character you outline. The former is edited by Prof. Ira Remsen, of Johns Hopkins University, and published by the Johns Hopkins Press Co., Baltimore, Md. The Journal of the American Chemical Society, as its name indicates, is the organ of the American Chemical Society, and is published at Easton, Pa.

Camphorated Phenol.

(J. J. J.) We cannot give the formula for the proprietary article. Under the above title Hager gives this formula:

Powdered camphor	100 parts
Carbolic acid crystals	36 parts
Alcohol	4 parts

Triturate together until an oily liquid results, or mix in a bottle and agitate frequently until solution occurs.

Bufalina recommends a combination of phenol with camphor under the name of "camphorated phenol," asserting that the camphor moderates the caustic and disorganizing action of the phenol without destroying its useful effects. He prepares it (U. S. Dispensatory, 17th edition, page 43) by mixing one part of carbolic acid with two parts of camphor, allowing the mixture to stand some hours, and purifying by washing with water. The liquid so prepared is of reddish-yellow color, having the smell of camphor, insoluble in water, and soluble in alcohol and ether.

Perfume For Laundry Soaps.

(G. E. L.) The following formulas, taken from Gathmann's "American Soaps" are of the character you outline. The quantities are calculated for a "frame" of about 1,200 pounds, and may of course be changed to suit:

(1) Oil of mirbane	1½ pounds
Oil of citronella	¼ pound
(2) Oil of mirbane	1½ pounds
Oil of sassafras	½ pound
(3) Artificial oil of sassafras	1 pound
Oil of citronella	1 pound

A little oil of cedarwood may be added if desired; it is said to make the odor more lasting.

(4) Oil of caraway	1 pound
Oil of fennel	¼ pound
Oil of cloves	¼ pound
(5) Oil of French pennyroyal	2 pounds
Oil of thyme (white)	10 ounces
Oil of lavender flowers	10 ounces
Oil of caraway chaff	5 ounces

Oil of kuro moji, saffrol and various other products are extensively used by manufacturers for perfuming soaps. The perfumes are incorporated into the body of the soap by milling or by "crutching" them in just previous to running the soap into the frame.

Tincture of Iodine, Oils and Spirit of Ammonia.

(W. J. F.) The following is an incompatible prescription with a possibility of the formation of an explosive compound:

Essential oil of mustard	1 dram
Oil sassafras	6 drams
Chloroform	1 dram
Tincture of iodine	½ ounce
Spirits of turpentine	½ ounce
Spirit of ammonia, enough to make	3 ounces

Use externally as directed.

Tincture of iodine is incompatible with the oils and spirits of turpentine, and the latter is pharmacaceutically incompatible with spirit of ammonia. The action of iodine upon oil of turpentine is quite well known, the products varying somewhat with the proportions in which they are brought together. In cold oil of turpentine iodine dissolves with a dark green color at first, but under certain conditions a violent explosion soon takes place (especially if part of the solid be in contact with

the air), yellow or violet vapors are evolved, and an acid resin is left behind. The vapors consist mainly of iodine and hydriodic acid. For an interesting discussion of these reactions see this journal, Oct. 15, 1894, page 352. Another explosive compound sometimes formed in mixtures containing iodine and ammonia, especially when the former is in slight excess, is iodide of nitrogen. This compound is not explosive when wet, but explodes violently upon the slightest touch when thoroughly dried. The prescription is a type of many often dispensed for liniments and the like.

Sarsaparilla Blood Purifier.

(M. E. S.) We cannot give the formulas for proprietary preparations. One of the following may serve your purpose:

(1) Taraxacum	16 ounces av.
Chimaphila	16 ounces av.
Stillingia	32 ounces av.
Sarsaparilla	32 ounces av.
Phytolacca	16 ounces av.
Lappa	16 ounces av.
Nanthoxylum berries	8 ounces av.
Potassium iodide	50 ounces av.
Sugar	15 pounds av.
Alcohol	

Water, of each, sufficient to make 5 gallons av.

Exhaust the drugs, ground in a coarse powder and contained in a percolator, with 32 pints of a mixture of 12 pints of alcohol and 20 pints of water. Continue the percolation with water until 32 pints of percolate are obtained. In this dissolve the potassium iodide and sugar; strain, and add sufficient water to make 40 pints.

(2) Potassium iodide	240 grains
Water	2 fl. ounces
Fluid extract of burdock	2 fl. ounces
Compound fluid extract of sarsaparilla	8 fl. ounces
Syrupy glucose, enough to make	16 fl. ounces

Mix. Dose, 1 to 4 teaspoonfuls, according to age.

(3) Sarsaparilla	6 ounces
Burdock root	3 ounces
Dandelion root	3 ounces
Prickly ash bark	3 ounces
Chamomile, Roman	3 ounces
Sassafras bark	4 ounces
Potassium iodide	1 ounce
Sodium salicylate	20 grains
Glycerin	2½ fl. ounces
Alcohol	24 fl. ounces
Water, enough to make	1 gallon

Grind all the drugs to No. 20 powder. Mix the glycerin and alcohol with 2 quarts of water. Macerate 24 hours and percolate. When the liquid has ceased to drop, pour in hot water until a gallon altogether has been obtained. Add the potassium iodide and sodium salicylate and dissolve. If not sufficiently dark to suit the eye, add 1 fluid ounce of caramel.

Similar formulas have been published from time to time in the Era. Consult the indexes.

NICKEL PLATING OF WOOD.—When wood is to be nickel plated by the galvanic method, it must first be covered with a thin layer of metal. For this purpose three solutions are necessary, prepared as follows: (1) Dissolve 1½ gm. of rubber in 10 gm. of carbon disulphide and add 4 gm. of melted wax. In another receptacle make a mixture of 5 gm. of phosphorus, 60 gm. of carbon disulphide, 5 gm. of oil of turpentine and 4 gm. of powdered asphalt, and add it to the first solution under agitation. (2) Dissolve 2 gm. of silver nitrate in 600 cc. of distilled water. (3) Dissolve 10 gm. of gold chloride in 600 cc. of water. The object to be plated, to which are attached the connecting wires, is immersed in the first solution, dried, and then the second solution poured over it until the surface has a dark, metallic appearance. It is rinsed off with water and treated in the same manner with the third solution. This gives the wood a yellowish color and it is now sufficiently prepared for galvanic plating. The nickel bath consists of a solution of nickel ammonium sulphate (500 gm.) and ammonium sulphate (50 gm.), in 10 liters of water. The fluid must be neutral to litmus. (Rev. Scient., through L'Union Ph.)

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, MARCH 31, 1898.

No. 13.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates:
U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,
Telephone: 5315 Cortlandt. P. O. BOX 1483, NEW YORK.
Cable Address: "ERA"—New York.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Maio 733.")

TABLE OF CONTENTS.

	PAGE		PAGE
EDITORIAL.....	461	Druggists and Illegal Sale	479
CORRESPONDENCE.....	464	of Poisons.....	479
ERA COURSE IN PHARMACY.....	465	Shorter Working Day.....	479
Inorganic Chemistry.....	465	National Association for	
Pharmaceutical Microscopy.....	467	Free Alcohol: To Protect	
Detection of Salicylic Acid		Trade-Marks: Mr. Gard-	
in Food.....	469	ner Resigns.....	480
The Medical News, New		A Utopian Scheme: Idiotic	
York Board of Health and		Legislation.....	481
Antitoxin Question.....	470	Phenacetine Injunctions:	
Liquid Air Demonstrations		Boston City Laboratory;	
Before the Society of		Advertising; Paskola Case.....	482
Chemical Industry.....	472	NEWS LETTERS.....	483
Examination Questions,		Pharmacy in Australasia.....	489
New York City Board of		BOARDS AND COLLEGES.....	490
Pharmacy.....	474	BUSINESS RECORD.....	491
The Drug Clerk in Sweden.....	474	BOOK REVIEWS.....	491
About Kauri.....	475	OBITUARY.....	492
PHARMACY.....	476	DRUGGISTS' ADVERTISING.....	493
QUESTION BOX.....	477	PATENTS, TRADEMARKS, ETC.....	494
NEWS AND TRADE DEPART-		STATE OF TRADE.....	495
MENT.....	479	MARKET REPORTS.....	496

"The British and Colonial Druggist," London.

Subscriptions and advertisements for this weekly drug journal will be received and forwarded through this office. Specimen copies and schedule rates will be furnished upon application.

A NEW EDITION OF THE ERA DRUGGISTS' DIRECTORY.

Every manufacturer of drug store goods who wishes to correspond with or send printed matter to the members of the drug trade has need for the Era Druggists' Directory. In order to make this publication as trustworthy as possible, and up to date, a revision has been made for a new sixth edition which will be ready for delivery early in April. It is estimated that the new edition will show over five thousand changes in firms and their locations, etc., which have occurred since the issue of the fifth edition about one year ago, a circumstance which has made the demand for a new edition quite urgent. Firms desiring copies of the new edition should order at once to secure prompt delivery. Price \$5.00 per copy, postpaid. D. O. Haynes & Co., Publishers, P. O. Box 1483, New York.

A Would-Be Crusader.

There is a certain class of newspapers in every city which, when they are hard up for material, go out and stir up the druggists for a little "copy." This spasmodic stirring up generally takes the printed form of a hotly worded screed to the effect that the people's lives are not safe because of the criminality of druggists in the matter of the sale of poisons and the like. These screeds are based upon a very flimsy foundation of reason, and supported by a reckless distortion of fact and misrepresentation of circumstances. The scribe's story must primarily be sensational, and truth and reason are ruthlessly sacrificed to make it so.

The latest city to be favored with this sort of stuff is New York. Here, the Telegraph has become hysterical over the fact that its reporters succeeded, by the usual questionable methods, in purchasing at a few stores certain scheduled poisons without proper registration there-of being made by the druggist. We have no doubt these reporters did induce some druggists to break the law; unfortunately there may be some druggists who are quite willing to do so, but the paper shows its contemptible nature when it deduces therefrom the conclusion which it publishes that druggists in general are law-breakers of this character. The Telegraph tries to justify this conclusion by printing the remarks of a number of physicians who are quite willing to malign and slander the druggists by all sorts of general accusations of substitution, prescribing, poison and liquor selling, and all around incompetence and wilful criminality. Its attack upon a reputable and honored class of men is unwarranted by the facts, and is disreputable in the extreme. Decent physicians and decent druggists denounce its story as a lie out of whole cloth.

If there are some druggists who sell poisons illegally, through ignorance, carelessness or wilfulness, there is an effective remedy. The police department possesses the power to punish and prevent this sort of thing; these are part of its duty.

If the Telegraph were only sincere in its loud-mouthed protestations of humanitarian motives it would co-operate with the police to prosecute those whom it discovers to be following criminal practices.

The cases cited come solely within the provisions of the penal code for treatment. The Telegraph shows its own ignorance of the law when it states it is the function of the Board of Pharmacy to prosecute.

An unfortunate feature of the affair is that a couple of members of the Board of Pharmacy have allowed themselves to talk about it to the reporters. These two are thus quoted:

No. 1.—"The action of the paper is most commendable. It is taking up a matter and prosecuting it in the fairest and most forcible manner possible which has for many years been almost an insurmountable obstacle to the Board of Pharmacy. The pharmacy laws are not enforced properly and they never have been. This has been due to lack of funds. Most druggists are honorable and try to respect the laws, but there are black sheep in all folds, and the drug trade is no exception. I have read with interest the articles in recent copies of the Morning Telegraph and while I cannot but be im-

pressed with their fairness and the honorable and fair manner in which the evidence was obtained, I must confess my surprise at the apparent present condition of the local drug trade. Any druggist who would sell poison under the conditions which poisons were sold to the writer of these articles, commits a most dastardly act. The evidence so far obtained by the *Telegraph* is in my possession and will be laid before the Board of Pharmacy next Monday. It is gratifying to realize that a great daily paper takes such an honest interest in a matter of so great importance."

No. 2.—"The *Morning Telegraph* conferred a real benefit not only upon the community but upon the drug trade in the publication of its clever and carefully and fairly prepared article of yesterday. The evidence secured by the reporter will be presented to the Board of Pharmacy at its next regular meeting on March 28. I have already communicated with the Secretary of State relative to existing laws relating to the cases in question and their interpretation. There are many druggists who violate the law, but I am satisfied 75 per cent. of the drug stores in Greater New York are properly conducted."

There could be little exception taken to these statements taken alone, but when they are misapplied by the newspaper to back up its arraignment they are given an importance and significance which are not inherently theirs. It is not the board's business to enforce the penal code governing the sale of poisons, and the members quoted were certainly lacking in discretion when they allowed their general statements to be applied to this specific question, to which they bear no real relation.

If, as stated by member No. 2, there are 25 per cent. of the drug stores in New York improperly conducted, that is, in violation of the pharmacy law, by unregistered men, the board would do well to look up these cases and discharge the duties for which it was appointed. The regulation of the sale of poisons can be left to the *Telegraph* and the police; it is not included in the provisions of the pharmacy law.

Very little harm, however, will be done by the *Telegraph's* ravings, for the general public will not see them.

Proprietors and Physicians.

As has been reported in this journal, there have been introduced into the New York Legislature during the present session a couple of bills entitled, respectively, "an act to provide for the proper labeling of poisonous articles" and "an act in relation to the sale of patent or proprietary medicines." Both of these bills are considered directly inimical to the interests of proprietors, and great opposition to them has developed. There is no likelihood that either will pass to enactment, their fate being to be held back in committee. Both are of a type of measures which are familiar to State legislatures throughout the country. In some instances they are honest in intention, conceived in earnest motive, in other cases they are veritable "strike bills" of the rankiest nature. But in all instances they must be fought by the patent medicine men to prevent their passage into law.

We have many times expressed our views relative to what sort of legislation regulating the sale of drugs and medicines, patents included, would be wise and just. It is unnecessary to go over the ground again with reference to these particular propositions. We wish merely to call attention to certain retaliatory measures which have been suggested by the Proprietary Association. These suggestions are that the bills should be amended, making it obligatory upon physicians to file a bond in each county where they practice, in the sum of \$5,000, guaranteeing to pay all damages that may be suffered by any person proscribed for after using a prescription issued by such physician; and that no practicing surgeon shall hereafter perform any surgical operation upon any inhabitant of this State until he shall have given a bond

with a like penalty, and that hereafter every prescription shall be issued in duplicate and written in plain English.

The plain inference from all this is that the proprietors attribute the attempted legislation to the physicians, influenced by personal motives. At any rate, the amendments, if made, are of a nature to lead the doctors to oppose, rather than support, the bills. The druggists seem to be left out in the shuffle entirely, but they would be the greatest sufferers. The first proposed amendment would have the effect of making all the doctors dispensers of their own medicines, for they would not make themselves financially liable for the acts of druggists who might compound their prescriptions. The druggists would farther suffer also from the general effects of the bills, if it became true, as asserted by the proprietors, that all patent medicines would be driven out of the State thereby. So there you are, the physicians would all be dispensers, the druggist would get no prescriptions, would have no patent medicines for sale, and would have to add other side lines, such as fish and hardware, to his present soda and cigar business to make a living. Talk about the advancement and elevation of the profession of pharmacy! What a gloomy future is foreshadowed by the legislation under discussion. But, who's afraid?

Gold From Sea Water.

There's money in water: soda water, mineral water, watered stock, etc., and all chemists will tell you there's gold in sea water. It is, however, sometimes difficult or profitless to get your money out of water, and it has generally been believed that this was particularly the case with the gold in sea water. But the Electrolytic Marine Salts Company, of North Lubec, Me., says it can be done all right, and in proof thereof it sent to the U. S. Assay Office in this city a few days ago some bullion which it claimed was produced by its process direct from sea water. The bullion, upon assay, showed a fineness of .3173 gold and .684 silver (the rest being some base metal), the whole being of the value of \$599.61 for the gold and \$32 for the silver. The question now is, how much did it cost to produce this amount, but concerning this the company is silent. It has been found that a ton of sea water contains gold to the extent of about 4 cents' worth, and on this basis it would require some 15,000 tons or so to produce the \$600 worth shown by this concern. Failing statistics and so forth, it is a little difficult for most of us to believe that the extraction of gold from water by electrolytic or any other process is yet a financially profitable accomplishment. Particulars are awaited.

Liquor-Selling Druggists.

A special committee of the Saloon-Keepers' League in Battle Creek, Mich., in a circular issued to the public, make a terrible arraignment of certain druggists in that city. They claim that they can prove by wholesale dealers that the druggists have sold more whisky and beer than the saloons. They claim that they have evidence for three cases against each druggist complained of and that the witnesses are prominent business men. They claim that they will prove that every druggist arrested was for a long time engaged in the sale of beer and whisky, and that they have back rooms fitted up for this very purpose, and farther, that two druggists have such a large and noisy retail trade that they have fitted up a room in the basement of their stores for this business where they serve lunches daily, nights and Sundays to their customers. This has so largely interfered with the saloon business as to almost ruin their trade, and it was necessary for them to stop the illegal sale of drugs themselves, as a blind, so that they could sell at all hours. The saloon-keepers pay a tax of \$500 and the druggists only \$25, and they claim that it is an injustice

to take their business away from them illegally as the druggists have been doing. It goes without saying that these charges cannot lie against the druggists of Battle Creek as a class, for the great majority there, as everywhere, are honest and law-abiding, but if true against one or two only it is a condition which cannot too soon be remedied. It is to be hoped that if the saloon-keepers are able to prove their charges, they may also succeed in securing a punishment to fit the crime. All the real druggists will join in this hope and help to secure the conviction and punishment, for it cannot be allowed that an honorable calling be brought to dishonor by these wanton acts of a few evil-doers.

These malefactors should all be served as was a druggist in Lapeer, Mich., who last week paid \$200 fine and \$37 costs to avoid serving sentence of a hundred days in jail for selling liquor for other than medicinal purposes.

Woman in Pharmacy.

Woman in pharmacy is an accomplished fact. She has come, she has seen, she has conquered. A young woman graduate last week from the Albany College of Pharmacy captured two first prizes, the highest honors, and last year, while a junior student, she secured first prize for the year's work. The young men will have to exert themselves else their sisters will outstrip them in the race. The number of women in this country engaged in pharmacy, as proprietors and clerks, is far greater than generally supposed. It runs well up into the hundreds, perhaps into the thousands. Each year, too, sees many matriculating at the various colleges of pharmacy to follow the full courses of instruction. It is impossible to longer ignore woman in this calling. She is well adapted to it, there is no valid reason why she shouldn't be in it, she is in it to stay, and we are glad of it. She is very welcome.

A Newspaper on the "Shorter Hours" Question.

The Milwaukee Sentinel voices some pretty level-headed opinions upon this question when commenting upon the bill before the New York Legislature. The bill is advocated by its authors, says the Sentinel, "on the ground that the long hours that clerks are obliged to work disqualify them for putting up medicines and poisons with safety to the public. The argument for the passage of the bill is, therefore, the proper protection of the public rather than the relief of the clerks from excessive labor. Doubtless the case was put in this way in order to promote the chances of its passage, inasmuch as the self-interest of the legislators is appealed to rather than their sympathy. None the less it is doubtful if this appeal will have much effect. The accidents resulting from mistakes of drug clerks are so rare that it would be difficult to persuade the average legislator of any actual danger to himself or his family from this source. Such accidents are seldom to be traced to an overworked clerk. They are doubtless due rather to inexperience or carelessness than to the exhausted condition of the clerks. The proposition that a clerk should not work more than eleven hours a day is a good enough one to stand on its own merits, instead of being bolstered up by the assertion that longer hours involve danger to the public. At the same time it is probable that the proprietors of drug stores do not exact an undue amount of work from their clerks. It has never been a prevalent impression that these clerks were an overworked class. If they are, they certainly constitute a most uncomplaining class. There is no drug clerks' union agitating for shorter hours, nor does there seem to be any organized effort in this direction. The proprietors and the clerks should be able to settle this matter between themselves without legislative interference."

Evidently the Sentinel is not very much afraid of the labor unions, and threats of boycott which constitute

the concealed whip relied upon by the supporters of the bill in question to bring into line the legislators at Albany. This whip scared some, keeping them from going on record through voting for the bill, but not enough to allow passage of the measures.

In the little Iowa town where ex-Governor St. John got himself into trouble recently for indorsing a druggist's application for liquor license, the so-called Citizenship League has succeeded in having all the liquor permits taken away from the drug store men. There is either a particularly disreputable variety of druggists in that town, or an especially fanatical and intemperate temperance element, perhaps both. Is it not possible, though, to punish the wilful wrong-doer, and leave the honest druggist alone? There are legitimate uses for liquor, and the druggist is the proper person to sell it for such purposes. If he does more than is his duty in this respect, and violates both moral and statutory law, then it is right he should be prosecuted; but don't punish all for the sins of one or a few.

Cut-throat practices are not, it seems, peculiar to the druggist's calling. Stimulated by the agreement of the druggists in a certain Minnesota county not to cut or undersell one another, the farmers of that section are agitating the question of setting definite prices upon their produce and not selling for less. If this thing goes through and becomes general the thrifty housewife can no longer be tempted by bargain sale butter and cut-rate eggs.

JAPANESE MUSHROOMS.—Mr. Robert P. Porter, who has been conducting investigations into the industries of Japan, states that one of the most interesting studies in that country is the growing of mushrooms in the Shikoku Island, where most of the camphor is produced. This is an important article of export, mostly to China, and during the year 1895, the last year for which the returns are available, the quantity of mushrooms exported from Japan to all countries amounted to 1,780,597 pounds. Of the numerous species of edible mushrooms, the one called *Shutake* is the most important, being abundantly exported abroad and also used for many culinary purposes at home. Logs which are used for cultivating this mushroom are various species of oak. The principal districts where this mushroom is produced are the provinces forming Shikoku, Kiushiu, Wakayama and Shiozuka prefectures. Oak trees twenty-five to thirty-three years old are felled in the autumn, and incisions made with axes at intervals of three or four inches, the incisions generally reaching the woody layer. The trees are then cut into logs of four or five feet in length and left in dark, secluded parts of the forest. After the third year mushrooms make their appearance in the incised portions. When the growth lessens they are replaced by new logs. The mushroom grows at each season of the year, winter, spring, summer and autumn, but the growth in winter and spring is the result of artificial stimulus. The logs are steeped in water for a number of hours, according to the dryness of locality, and then struck with pommels or axes to prepare the beds for facilitating the growth of the mushrooms. The autumn crop is the most abundant. After being collected, mushrooms are dried either by the sun or by artificial heat.—*Jour. Soc. Arts. (Sci. A.)*

ERNOL is a new remedy for chilblain, claimed to be composed of extr. cerevis (?), fl. ext. plant., lanolin, ichthyol, petroleum, petrolatum and oil of peppermint. It is a sticky mass, in which Dr. Aufrecht (Ph. Ztg.) could find no fluid extracts or petroleum. It was found to be a badly prepared mixture of woolfat and petrolatum, with small quantities of phenol, ichthyol, balsam Peru and oil of peppermint. (Ph. Post.)

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

THE SHORTER HOURS QUESTION.

New York City, March 20, 1898.

An open letter to those contented and fortunate drug clerks employed in or residing in the Senatorial district represented by Senator Ford:

Gentlemen: Your lot is certainly a very happy and satisfactory one, to judge by the letter you sent to Senator Ford protesting against the insinuation that your names were signed to the petition opposing the shorter hours bill by intimidation from your employers. Of course there was no intimidation about this last letter either. I do not suppose that any of you had in mind that near (?) future when you also hope to have a store of your own and employ clerks. You were not influenced by the idea that such laws then may seriously interfere with your freedom of exploitation. (For I entertain that idea, in that respect differing with leaders of the D. L.) Neither do I suppose that any of you thought it would be advisable to keep solid with your employer and therefore signed the petition. Oh, no! None of you would be guilty of any such misapprehended self-interest. Neither were your errand boys required to sign the petition. All such insinuations would be very contemptible on my part, so I will take it for granted that you all oppose the bill in good faith. But now let me examine a few of the many reasons which you gave for your actions. I will examine those you did not give, as they come. In the first place, you all enjoy an entire Sunday every other week, of which you would not like to be deprived. I think there will be a rush of clerks looking for positions in your locality after this assertion, as most clerks do not enjoy this. In cases where clerks sleep behind the store that entire Sunday generally begins at 9, 10 or 11 o'clock and in many cases at 1 or 2 o'clock in the afternoon. But then the employers are not all so liberal as they are in Senator Ford's district.

Second.—By working but ten hours a day you do not reasonably expect the customary free afternoon you now enjoy, but all clerks do not enjoy that free afternoon, and there might be some way found of settling that difficulty. If you read the bill carefully you find that it would not compel us to stop work at a certain hour, 9 o'clock, for instance, that it even allows eleven hours of work in one day. It certainly follows that if we work eleven hours a day for four days, there would be four hours coming to us that would give us a good part of the afternoon of a fifth day every week.

Third.—You gentlemen are certainly very modest. You do not expect the same compensation for your services. That compensation is little enough now and I do not doubt that some effort will be made to lessen it, but you must consider that an organization can do a good deal toward regulating working hours and salaries. In this struggle it is absolutely necessary that drug clerks should be organized and act as one man. "In union there is strength." As for the additional clerk, I would say that where there is so much work as to make one necessary there will also be the necessary means to pay his salary with. Of course this would put the employer to more expense, but that is just the cause of very much of the opposition to the bill.

Fourth.—You object to the clause prohibiting the sleeping behind drug stores, when such does not exist, provided that the room is properly ventilated. Yours certainly are, according to your own statement, consequently this clause does not interfere with you and you may save the expense of hiring lodgings. The condition

of the rooms and beds in which many clerks sleep is certainly often filthy and a change is very desirable. That sleeping in rooms saturated with the fumes and gases of drugs and chemicals is very detrimental to health is beyond doubt; we learn in the primary classes of every school that our sleeping apartments must be well ventilated. Pure air is essential to good health, but by working in the store all day and sleeping in it, as many clerks do, at night, pure air is denied us.

AMICUS.

A PARCELS POST DESIRED.

Chicago, March 21, 1898.

To the Editor.

We beg to call your attention to an effort being made by ourselves as well as other leading shippers of pharmaceuticals, patent medicines, etc., to have a Parcels Post established in this country, as it now exists in Europe and fifteen other countries, Mexico, etc. (at 12d. per pound to 12 pounds), in connection with the United States, but not granted to our own shippers, consumers, or dealers. You are no doubt aware of the immense saving in transportation charges resulting from the adoption of a Parcel Post in connection with our Postoffice Department, aside from the increased revenue to the department itself. The exorbitant tariff of the express companies has become so burdensome to shippers that the sending of packages to any great distance more than consumes the profits on the goods, and therefore much trade has to be discontinued, which we otherwise could profitably cultivate. We propose to send a circular letter to every wholesaler and medicine shipper in the United States, together with a petition blank for signatures, urging upon the respective members in Congress from every district to pass a law establishing the Parcel Post in connection with the P. O. Department.

We have already agitated the matter in our immediate vicinity, and in every instance have received the heartiest indorsement and co-operation as well as financial support for the purpose of issuing circular letters, petition blanks, arguments and statistics, and such other expenses as must necessarily be incurred in the prosecution of the object in view, but which of course, cannot be borne by ourselves or a few others alone, while every one is interested and will be benefited. Thus far we have received subscriptions of \$50 from those approached, including ourselves. The disbursement of the fund will be in the hands of a committee to be appointed by those subscribing, and we trust we can have you with us for the attainment of the end desired. Yours respectfully,

KOENIG MEDICINE CO.

YEA, GIVE THE DEVIL HIS DUES, BUT NO MORE!

Pittsburg, Pa., March 19.

To the Editor.

Reply to N.—Pharmaceutical Era, March 17, 1898. Angels and ministers of grace defend us!

Be thou a spirit of health, or goblin damn'd,
Bring with thee airs from heaven or blasts from hell,
Be they intents wicked, or charitable,

Thou com'st in such a questionable shape
That I will speak to thee: I'll call thee X—, Y—, or Z—. O, answer me, tell me, who did provide for Lavoisier, for Davy, for Priestley, for Berthelot, Avagadro, Berzelius, Liebig, Bunsen, Parrish, Proctor, Maiesch, Schefter, and thousands of other chemists? It is known full well that their families did not enter the confines of the hypocrisy of New York's Four Hundred, nor do we find their names recorded in the vocabulary of Pittsburg's Blue Book, yet, kindly enumerate those who were familiar with the pangs of hunger.

Wilt thou, or some kind agent of the occult, mention one-half the sins committed in the name of "synthetic chemistry" and of "copyrighted pharmacy," one-half, methinks, would make a book full of wisdom.

Don't know what Paracelsus has taught thee, and me? I will remind thee, for thus spake he: "The true use of chemistry is not to make gold, but to prepare medicine."

Yours without dues or with,

LOUIS EMANUEL.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.

Vincent Coblentz, A.M., Ph.M., Ph.D., F.C.S.

Wilber G. Compher, A. M., M. D.

Albert E. Ebert, Ph.M., Ph.D.

James M. Good, Ph.G., M.D.

Arthur L. Green, M.D., Ph.D., Ph.C.

Charles F. Heebner, Ph.M.B., Ph.G.

George B. Kauffman, B.Sc., Ph.D.

E. J. Kennedy, Ph.C.

Henry Kraemer, Ph.G.

Edward Kremers, Ph.G., Ph.D.

John Uri Lloyd, Ph.M., Ph.D.

Oscar Oldberg, Ph.D.

Charles W. Parsons, Ph.C.

Edgar L. Patch, Ph.G.

George F. Payne, Ph.G., M.D.

T. D. Reed, M.D., C.M.

Edsel A. Ruddiman, Ph.M., M.D.

Henry H. Rusby, M.D.

L. E. Sayre, B.S., Ph.M.

Wilbur L. Scoville, Ph.G.

William Simon, Ph.D., M.D.

F. E. Stewart, M.D., Ph.G.

Julius W. Sturmer, Ph.G.

Frederick J. Wollong, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in **THE PHARMACEUTICAL ERA**, and the **QUIZZES** and **EXAMINATIONS** are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and **DIPLOMAS** are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the *ERA*, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 57.

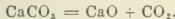
Inorganic Chemistry,

The Alkaline Earth Metals—(Continued).

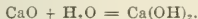
COMPOUNDS OF CALCIUM.

Oxygen Compounds.—With oxygen calcium forms the well-known substance lime, CaO , or calcium oxid. A dioxide, CaO_2 , is also known.

Lime is prepared by heating any of the forms of calcium carbonate in kilns to a low red heat to drive off carbon dioxide.



The product of this ignition, CaO , is the substance known as quick-lime. In the air it absorbs moisture and carbon dioxide and becomes "air slaked." When brought into contact with water it combines with that liquid and forms the hydroxide, technically known as slaked lime, a large amount of heat being released during the operation.



Slaked lime mixed with sand in proper proportion forms mortar. In course of time the lime of the mortar gradually absorbs carbon dioxide from the atmosphere and thus forms a hard mass of carbonate, binding the masonry firmly together. The sand assists in the hardening by rendering the mass more porous, thus facilitating the access of carbon dioxide to the interior portions.

A variety of lime which hardens under water is known as "water lime" or Portland Cement, and is made from a lime stone containing aluminum and silica in certain proportions. The hardening of this substance takes place very rapidly, probably through formation of calcium aluminate and silicate.

A saturated solution in water containing about 0.17 per cent. Ca(OH)_2 is used in medicine under the name of lime water. As lime is less soluble in warm than in cold water, lime water becomes turbid on heating, from deposition of lime.

Halogen Compounds.—Calcium chloride, CaCl_2 , is formed when lime or calcium carbonate is dissolved in hydrochloric acid. It is found in solution in sea water and in certain mineral springs, and is also produced as a by-product in certain manufacturing operations. It has a great affinity for water, and on this account is much used in the drying of gases. It is very deliquescent,

and when exposed to the air absorbs water and liquefies.

Calcium bromide, CaBr_2 , and calcium iodide, CaI_2 , may be prepared by dissolving the carbonate or hydroxide in hydrobromic or hydriodic acids. They resemble the chlorides in their physical characters, and are deliquescent. They have been used to some extent in medicine.

Calcium fluoride, CaF_2 , occurs as the mineral fluor spar, crystallizing in cubes or octahedrons, generally colorless, but sometimes colored red, yellow, green, blue or violet, and very showy. The fact that this mineral becomes luminous when heated has given rise to the term fluorescence. It is insoluble in water, and is employed as a source of hydrofluoric acid.

Salts of the Oxygen Acids.—Calcium sulfate occurs in nature as gypsum, satin spar, alabaster, etc. Native gypsum has the composition $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. When heated to 100° to 120° C. it loses water and is known as burnt gypsum or plaster of paris. When the latter is mixed with water, heat is evolved, and the substance again takes up water and solidifies or "sets" to a hard mass. (On account of this property it is largely used in the manufacture of quick setting wall plasters and in the making of casts.)

Calcium sulfate is soluble in about 500 parts of water at common temperatures, less soluble in hot water. It is dissolved by solutions of sodium and ammonium chlorides, and of sodium thiosulfate.

Calcium Phosphates.—Calcium forms several phosphates, of which the normal or orthophosphate, $\text{Ca}_3(\text{PO}_4)_2$, is the most important. This is the important constituent of bone, and is found in the mineral kingdom in immense deposits. It is insoluble in water, but soluble in acids. It is employed largely in the manufacture of artificial fertilizers and as the source of phosphorus. Precipitated calcium phosphate is official, and is employed as an absorbent of volatile oils in the preparation of the medicated waters.

Other compounds of calcium are the sulfite, nitrate,

sulphid, phosphid, etc., but are of less importance than those already described.

Calcium hypochlorite, or chlorinated lime, has been sufficiently described under chlorine.

Characteristic Reactions.—Calcium compounds, especially the chlorid, color the non-luminous flame reddish yellow, or orange red. The spectrum consists of numerous bright green and orange lines. It is distinguished from magnesium by the insolubility of its carbonate in ammonium chlorid, and from strontium and barium by the greater solubility of its sulfate. If to a solution of calcium with salts of the latter two elements a sulfate is added, the strontium and barium are completely precipitated and the most of the calcium also, but still leaving enough of the latter to give a distinct precipitate with ammonium oxalate.

STRONTIUM.

Symbol Sr. Valence 2. Atomic Weight 87.3. Specific Gravity 2.5.

Historical.—The natural compounds of this element were long confused with those of barium. Its existence as an element was established in 1792 and 1793 by Hope and Klaproth, but the metal was not isolated until 1808, by Davy, who obtained it by electrolysis. The name is derived from Strontian, a village in Argyllshire, where the mineral strontianite, or the native carbonate, is found.

Natural Occurrence.—It occurs mainly as Strontianite, SrCO_3 , and as Celestine, SrSO_4 , and is also found associated with calcium in aragonite, and with barium in baryto-celestine. It likewise occurs in some mineral waters, in the sea, and in the ashes of certain sea plants.

Preparation.—The metal may be obtained by the electrolysis of its chlorid, or by reduction of the latter with sodium amalgam.

Description and Physical Properties.—Strontium is a lustrous, yellow metal of specific gravity 2.5, and melts at a red heat. It is malleable and ductile, and is harder than calcium or lead.

Chemical Properties.—It oxidizes quickly on exposure to the atmosphere, burns with a brilliant light when heated in the air, and decomposes water energetically.

COMPOUNDS.

Oxygen Compounds.—Strontium forms two oxids, SrO , and SrO_2 , and a hydroxid, Sr(OH)_2 . They are of but little importance except scientifically. The carbonate, sulfate and nitrate resemble in many respects the corresponding compounds of calcium and barium. The sulfate, however, is less soluble than the calcium sulfate and more soluble than that of barium. The nitrate is used in pyrotechny in the production of red fire.

Halogen Compounds.—The halogen compounds in general resemble the corresponding preparations of calcium.

The bromid, iodid and lactate are recognized by the U. S. Pharmacopoeia, and are used to some extent in medicine.

Characteristic Reactions.—The volatile salts of strontium color the non-luminous flame a splendid crimson, and yield a characteristic spectrum, consisting of six lines in the red, and one each in the orange and blue, with others of less significance.

Strontium, in the absence of barium, is distinguished from calcium by the lesser solubility of its sulfate. On this account a solution of calcium sulfate will produce a precipitate in a solution containing strontium.

BARIUM.

Symbol Ba. Valence 2. Atomic Weight 136.9. Specific Gravity 3.75.

Historical.—Certain of the compounds of barium have been known for a long time. In 1602 V. Casciorolus, a shoemaker of Bologna, discovered the remarkable fact that the so-called heavy spar when ignited with carbonaceous matters acquired the property of phosphorescing in the dark. This substance became popularly known as the Bolognian Phosphorus, and for a long time

the mineral from which it was derived was supposed to be a variety of gypsum. In 1774 heavy spar was again investigated by Scheele, who found it to contain a new earth, for which Guyton de Moreau in 1779 proposed the name *barote*, from the Greek *buros*, heavy. In 1808 Davy succeeded in obtaining the metal by electrolysis of the chlorid in presence of mercury, and decomposing the resulting amalgam by heat.

Natural Occurrence.—The two chief minerals containing barium are witherite, BaCO_3 , and barite or heavy spar, BaSO_4 . The latter mineral is frequently found associated with galena. The element also occurs in several complex silicates, and feldspathic rocks, and in certain mineral waters and in the sea.

Preparation.—The metal is usually obtained by the electrolysis of a thick mixture of the chlorid and dilute hydrochloric acid, in the presence of mercury, at a temperature of 100°C . The resulting amalgam is heated to drive off the mercury, when barium is left behind as a porous mass.

Description and Physical Properties.—The element has a yellow color like the two preceding, a brilliant metallic luster, and melts above a red heat. Its specific gravity is 3.75.

Chemical Properties.—It decomposes water violently, and hence must be preserved under petroleum. Though its compounds are of importance, the element itself is not used.

COMPOUNDS.

Oxygen Compounds.—Barium forms two compounds with oxygen, the monoxid, BaO , and dioxid, BaO_2 . The first is formed when the metal burns in air, or when the nitrate is heated until the acid radical is driven off. It combines with water with much greater avidity than calcium oxid, becoming incandescent when merely sprinkled with that liquid.



The hydroxid which is thus formed has properties similar to quick-lime, but is more soluble. A solution is used in chemical analysis under the name of baryta water.

When the monoxid or hydroxid is heated to redness in a current of air the dioxid is formed. The dioxid combines with water to form the hydrate, $\text{BaO}_2 \cdot \text{SH}_2\text{O}$, used pharmaceutically in the preparation of solution of hydrogen dioxid.

Halogen Compounds.—Barium chlorid, BaCl_2 , may be obtained by dissolving either the native or artificial carbonate in hydrochloric acid and crystallizing. It crystallizes with two molecules of water, and forms transparent rhombic tables. Its principal use is in the laboratory as a reagent for sulfuric acid and the sulfates.

The other halids of barium resemble the corresponding compounds of calcium and strontium.

Barium sulfate, BaSO_4 , the native form of which is known as heavy spar, may be prepared by the precipitation of any soluble barium salt by a sulfate.

This compound, on account of its unalterability in air and its insolubility, is largely used as an adulterant of or substitute for white lead, under the name of permanent white. Its advantage of permanence and cheapness are largely offset, however, by its lack of body or covering power, due to the transparency of its crystals.

Barium sulfate is practically insoluble, requiring 400,000 parts of water for solution. It is somewhat more soluble in acids.

Barium Nitrate, $\text{Ba(NO}_3)_2$, may be prepared by dissolving the carbonate in nitric acid, or by the double decomposition of sodium nitrate and barium chlorid. It is used in pyrotechny in the production of green fire, and in the manufacture of explosive powders. Its principal use is as a reagent in the detection and estimation of sulfuric acid.

Barium carbonate, BaCO_3 , in the natural form is known as witherite, and may be prepared artificially by

the precipitation of a soluble salt of barium by an alkaline carbonate. It is used as a reagent and in the manufacture of vermin poison.

Characteristic Reactions.—Volatile compounds of barium color the non-luminous flame greenish yellow. Its spectrum is characterized by several distinct green lines.

With sulfuric acid or soluble sulfates barium compounds yield a fine, white, crystalline or granular precipitate of barium sulfate, distinguished from many other white precipitates by its insolubility in acids, unless concentrated and in large excess.

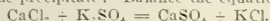
Its salts are distinguished from those of calcium by yielding a precipitate with solution of calcium sulfate, and from strontium by precipitating with potassium dichromate, and from both of the latter elements by the color of its flame and spectrum.

PRACTICAL STUDIES.

1. With a perfectly cleaned platinum wire test a solution of calcium chlorid in the non-luminous flame of the bunsen burner or alcohol lamp. Study the appearance of the flame carefully.

If calcium chlorid is not at hand dissolve some prepared chalk (calcium carbonate) in hydrochloric acid, and dilute with water.

2. To dilute solution of calcium chlorid add solution of potassium sulfate as long as a precipitate is produced. What is the precipitate? Balance the equation—



3. Filter the last mixture, and to the clear filtrate add solution of ammonium oxalate. What occurs? Write an equation representing the reaction.

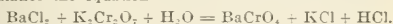
4. Expose some clear lime water, in a dish or watch glass, to the air for some time. What appearance does it present? Why should lime water be preserved out of contact with air, and with lime in the bottom of the vessel?

5. Test solution of strontium chlorid in the non-luminous flame, and observe its appearance carefully. What element previously studied gave a somewhat similar flame?

6. To solution of strontium chlorid add solution of potassium dichromate. What is the result? Compare with the corresponding experiment with barium chlorid.

7. Test a solution of barium chlorid in the non-luminous flame, and study the result carefully.

8. To solution of barium chlorid add solution of potassium dichromate. What occurs? Compare with No. 6. Balance the equation—



9. To solution of barium chlorid add solution of potassium sulfate, and note the result. What is the probable composition of the precipitate produced?

10. Pour off the supernatant liquid from the preceding, and test the solubility of the precipitate first in hydrochloric and afterward in nitric acid.

LECTURE No. 58.

Pharmaceutical Microscopy.

PREPARATION AND EXAMINATION OF OBJECTS UNDER THE MICROSCOPE.

The method of preparation necessary to fit a particular object for examination under the microscope depends upon the character of the object to be examined. If this is already sufficiently thin and transparent to permit the passage of light rays through it, it is only necessary to place it on a slip of glass, add a drop of the mounting fluid, water, glycerin, etc., cover with a cover glass, and proceed to the examination as previously described. A very great number of objects are available for this method of procedure, and the beginner should examine as many of them as convenient, both as an introduction to microscopical technique and as a means of familiarizing himself with the microscopic appearance of as large a number of substances as possible. Many other substances, however, are not adapted to this simple method of preparation, and for these there are necessary the special courses of preparatory treatment which are next to be considered.

Simple Objects for the Microscope.—Among these may be included all those which are already in the form of thin sections, small particles or powders, or of fiber-like form.

As previously explained, the object of the mounting fluid is to render the object sufficiently transparent for the passage through it of the rays which are to form the image. An example of this effect of a liquid is seen in the wetting of paper, which is thereby made more or less translucent, or if oil or fat be used instead of water, it may even become transparent. This saturation of a tissue with a liquid for the purpose of making it more pervious to light is spoken of as clearing when accomplished with such substances as a volatile oil, benzol, etc., though there is really no good reason for this restriction of the term.

Of the mounting fluids we have a considerable range to choose from. If the object is one of temporary interest only, water, glycerin diluted with water, diluted alcohol, turpentine, clove oil, or other similar liquid may be used. If the object is to form a permanent preparation for subsequent examination or study, glycerin-jelly, Canada-balsam, and the like, are employed, which preserve the object, and are not dissipated by evaporation.

Supposing a vegetable powder is to be examined, as a powdered drug, starch, etc., a good way of proceeding is to take a clean glass slip, breathe upon one side of it, and press this side to the powder, when a small portion will adhere. With a small pipette add a small drop of water, and cover with a cover-glass, holding the latter with a pair of fine forceps, and allowing one edge to touch the drop of water first, so that as the glass descends it will drive the air bubbles before it. If water does not make the powder sufficiently transparent to display the internal structure, make a fresh preparation, using a mixture of water and glycerin. If the last method does not answer, make another trial, substituting turpentine.

No more of the mounting fluid should be added than will just fill the space beneath the cover-glass. If more is used, the excess should be absorbed by means of a piece of blotting paper.

Decolorizing Dark Objects.—Some vegetable powders, especially those containing epidermal tissues, are so loaded with coloring matter as to be practically impermeable to light. These may frequently be decolorized by macerating for several hours to several days in a solution of potassium or sodium hydrate, or in a solution of chlorinated soda or chlorinated lime. This treatment should be followed by a short maceration in diluted hydrochloric acid, to neutralize the alkali, and the operation completed by a thorough washing in distilled water.

For the purpose of these macerations, deep watch



Fig. 34a. Syracuse Watch Glasses.

Schulze's maceration may be employed to remove coloring matter and increase the transparency. For this purpose the powder is placed in a test tube, several small crystals of potassium chlorate added, some nitric acid poured in, and the mixture heated to boiling over a gas flame or an alcohol lamp. This treatment is followed by a thorough washing in distilled water.

By this method the tissues are generally deprived of color, and the larger fragments so disintegrated that they can be "teased" or torn apart by means of needles set in handles, and their internal structure, as the forms and markings of cells, fully displayed.

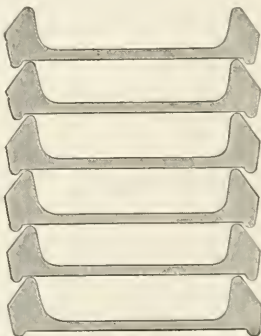


Fig. 34b. Syracuse Watch Glasses.
(Cross Section.)

Staining.—Sometimes it is necessary to adopt a process the reverse of "clearing," or rendering transparent, in order to bring out details of structure. This is when the particular features which are to be demonstrated are in their effect upon the rays so much like the material in which they are imbedded that they cannot be distinguished from it. In such cases a process of staining must be resorted to, or the object treated with coloring matter in solution, some of the cell elements taking up the stain and becoming visible, while others reject it and remain transparent.

An example of how a stain acts may be seen by coating one end of a glass rod with ink and drying. If the clean end of the rod be dipped in turpentine it will be nearly invisible, because the refractive powers of glass and turpentine so closely resemble each other. If now the colored end be immersed in the liquid, the ink renders it clearly visible.

Stains may be applied either by macerating in solutions contained in watch glasses, afterwards washing in water, or they may be applied to objects under the microscope by permitting the liquid to escape slowly from a pipette at one side of the cover-glass, while a bit of absorbent paper is held at the opposite side. The absorption of the liquid by the paper causes a current under the cover-glass, which draws in the stain.

The stain in every case should be dissolved in the

same kind of liquid as the one which it is to displace, or with one readily miscible with it, otherwise a perfect replacement cannot be effected.

Schulze's Maceration.—Where the preceding treatment fails to give satisfactory results,

the same kind of liquid as the one which it is to displace, or with one readily miscible with it, otherwise a perfect replacement cannot be effected.

The subject of stains and staining will be given further consideration when the preparation of sections is discussed.

Application of Reagents.—Frequently the forms of objects seen under the microscope are not sufficiently distinctive to identify them, and they must be observed as to their reaction with certain reagents. In such cases, the reagent, in solution, may be employed as in staining under the cover-glass, i. e., by applying with a pipette to one side of the cover-glass, while the liquid already present is withdrawn by a bit of blotting paper on the other side. Some of the more important reagents used in this manner are solution of iodine, solution of chlorzinc iodid, or a syrupy solution of zinc chlorid to which iodine has been added, acetic and hydrochloric acids.

Iodine solution colors starch blue. Chlorzinc iodid colors cellulose violet or purple. Acetic and hydrochloric acids dissolve particles or crystals of calcium carbonate with effervescence. Hydrochloric acid dissolves calcium oxalate, but without effervescence. Acetic acid does not affect calcium oxalate. Particles of silica are not attacked by either acid.

Many other reagents and their reactions are described in the larger works on microscopy.

Hairs and Fibers.—As these are frequently present in microscopic preparations, the student should study all such objects until they can be recognized readily and with certainty. Hairs of men and animals, wools of different kinds, silk, cotton, linen, etc., should be examined in any of the mounting fluids mentioned, with and without stains, until their several characteristics are firmly fixed in the mind. When hairs are the subject of examination they should be given several days' treatment with turpentine in order to render them sufficiently transparent.

Microscopic Plants and Animals.—Many interesting and valuable studies may be made upon the material which may be found in every stagnant pond or ditch. For this purpose a quiet pool is selected, and a glass vessel, as a fruit jar, filled with the water, along with the vegetation which is present, and including several plants torn from the bottom. The slime which covers the latter will prove to be the abode of a swarm of interesting animal and vegetable forms.

The jar with its contents may be set in a sunny window, and will furnish many an hour of instruction and amusement with the organisms which it contains.

To examine it a drop of the liquid is taken up with a pipette, placed on a slip, and covered with a cover-glass. If moving animals or plants are to be examined, the cover should be elevated by means of fine sand grains, bits of thread, pieces of broken cover-glasses, or in some other way so as to permit freedom of motion to the swarming animalcules. The "drop culture slide," consisting of an ordinary glass slip with a depression ground in the center, will be found a very convenient means for making such examinations, and will take the place of the more expensive stage aquarium.

A drop of actively fermenting yeast may be used in the same way, to study the form and growth of the yeast plant.

Other objects which may be examined with profit and interest are the various kinds of molds found on bread, cheese, leather, etc., mounted in water, or glycerin and water.

Blood Corpuscles.—To study blood corpuscles, sterilize a fine needle by passing it several times through a gas or alcohol flame, and prick a fold of skin on the back of the wrist or the end of the finger. Squeeze out a drop of blood, collect it on a clean cover-glass, and invert on a slip.

Under the microscope the red corpuscles, in the shape of colorless or slightly yellow biconcave disks, will be

observed to arrange themselves in rolls, like rolls of coin, the fluid portion of the blood appearing as a colorless liquid. Possibly a white corpuscle, of more or less irregular outline, may be seen among the others.

Pollen Grains, Chlorophyll Bodies, etc.—Pollen grains of various plants make beautiful and interesting objects, and should be studied, mounted in water or other liquids. For the study of chlorophyll bodies, the surface of a leaf should be scraped with a knife blade, and the thin tissue obtained mounted in water. In addition to the green chlorophyll bodies, contained in the cells, the specimen affords a good opportunity for the study of epidermal cells, and the *stomata*, or breathing pores of the leaf. Glands and hairs from plants and their flowers likewise afford a great variety of forms which will richly repay study.

For the study of the different varieties of cells found in vegetable tissues, the substance may first be treated with Schulze's maceration to bleach and loosen the tissue so that it can be teased apart on a glass slip by means of the needles previously described.

Urinary Sediments.—One of the portions of his profession which it will pay the pharmacist to cultivate is the examination of urine for physicians and others, and in this examination an important part is played by the microscope.

The method of examining urinary sediments is extremely simple. The urine being permitted to settle in a conical glass, a portion of the sediment is removed with a pipette, placed on a slip, and covered as previously described. Instead of waiting for the settling of the solid matters, one of the various patterns of centrifugal machine may be made use of, to cause a rapid subsidence. Some of the important organic deposits in pathological urine may often be brought out with great distinctness by permitting a staining fluid to flow under the cover-glass.

The student should familiarize himself with the appearance of the principal deposits from the illustrations given in works on urinary analysis and from prepared slides of such sediments.

Diatoms.—Of many interesting microscopic objects which can be obtained from a pond of stagnant water are the remarkable forms of vegetable life known as diatoms, whose siliceous skeletons, many of them beautifully marked and carved, serve admirably as test objects by means of which the perfection of objectives and oculars is tried.

To obtain specimens of these the slimy coating of water plants is washed into a test tube, covered with nitric acid, and boiled thoroughly. Or instead of nitric acid, sulfuric acid may be used, with addition of some solution of potassium dichromate. After treatment with acid, the tube is filled with water, shaken, then permitted to subside, and the liquid poured off. This washing is repeated several times. The diatoms are poured into a watch glass, with the last portions of the water, and dried. The dried residue is next moistened with turpentine, a drop of Canada balsam placed in the middle of a glass slip, the diatoms added, and a cover-glass applied, and set aside to dry and harden.

Chemical Crystals.—Chemical substances which crystallize readily form beautiful objects either for temporary study or for permanent mounts. The method of preparation is usually extremely easy, simply consisting in the dropping of a solution in water or alcohol on a clean slip or cover-glass, and permitting the liquid to evaporate. As a rule, the most perfectly formed crystals are obtained from dilute solutions which are caused to evaporate slowly.

Substances containing water of crystallization may simply be melted on the slip or cover-glass, and allowed to cool.

A permanent mount of crystals may be made by placing a drop of Canada balsam on the center of a slip, and

pressing down upon it a cover-glass upon the under side of which the crystals have been formed.

Among the substances which may be tried by the foregoing methods, are the ferrocyanide and ferricyanide of potassium, chromate and dichromate of potassium, potassium permanganate, copper sulfate, borax, tartaric acid, etc.

In the case of organic substances soluble in balsam, very beautiful permanent mounts may be made by placing a drop of balsam on the center of a slip, adding a few crystals of the substance, and heating until they are dissolved, covering with a cover-glass, and allowing to cool.

While the directions previously given will serve for the preparation of a vast number of objects, numerous other substances require quite different processes of manipulation to fit them for observation. This is especially true in the study of animal and vegetable histology, where it is desirable to observe both the forms of the cells and their relations to each other. These preparatory manipulations may be classed in three divisions. Sectioning, Staining, and Mounting, and the tissues to which they are applied into Soft and Hard.

THE DETECTION OF SALICYLIC ACID IN FOODS.

BY F. A. GENTH, JR.

In the examination of foods for salicylic acid, the so-called distillation method, suggested by G. Krause and fully described by Mr. McElroy, is the one most frequently used.

The method is as follows: The mass is pulped with phosphoric acid in a mortar, water added if necessary, and after some time strained through a cloth. About 50 to 75 cubic centimeters of the liquid is then subjected to distillation, and successive portions of 5 cubic centimeters each of the distillate collected and tested with ferric chloride. If salicylic acid has been used as a preservative, it will be distilled with the water vapor, and give a violent coloration when ferric chloride is added. In the first portions of the distillate no reactions may be obtained, and in cases where only very small amounts of salicylic acid are present in the article under examination, the reaction in the last portion of the distillate would not be very marked. The methyl ester reaction, which is likewise recommended as a test for salicylic acid, cannot always be obtained when the amount present is small.

No other substances have been known to yield distillates giving similar colorations, or any reactions interfering with that for salicylic acid under the above circumstances.

The writer has recently had occasion to examine a series of preserves, such as jellies, jams, catsup, etc., for preservatives. Among the samples submitted were a number obtained through the courtesy of Food Inspector H. J. Hackett, and were known to be free from salicylic acid or other preservatives. In the examination of these latter samples according to the above described method, a color reaction similar to that given by salicylic acid was found in all cases. When tested with ferric chloride, the first portions of the distillate showed little, if any coloration, and only as the distillation continued did it become more marked. In many cases the distillation process was not continued to within the last 10 cubic centimeters, but was stopped with over 25 cubic centimeters still remaining in the flask. The coloration in dilute solutions was violet, of about the shade and color of similar ferric salicylate solutions; in more concentrated solutions the color was much redder in the case of the distillate from the pure food, and was found to effectually hide the presence of small amounts of salicylic acid, when added.

The nature of the distillates and the examination of food-stuffs for salicylic acid will be further investigated. (Jour. of the Franklin Inst.)

THE MEDICAL NEWS, THE NEW YORK BOARD OF HEALTH AND THE ANTITOXIN QUESTION.

The infallible sign of a bad cause is a perversion of the truth. An erroneous statement, or a hasty and faulty conclusion, is common enough among the partisans of both sides of a disputed question, for not to many men is given the gift of building the subtle bridge of conviction from accurate premises to sound and unassailable deductions. Thus, men who reason badly may argue honestly, and many a mistaken assertion may be prompted by a profound veracity of motive. Not so, however, when in the compass of a brief plea we observe a succession of misstatements, of assumptions that will not bear a moment's analysis, of dogmatic assurances which bristle with slovenly inaccuracies, of misrepresentations which stamp their author as a not too dainty partisan and special pleader.

Dissenting from the almost unanimous opinion of the medical press of America, the *New York Medical News*, in an editorial which was palpably inspired or written by a member of the Health Board, energetically opposes the bill introduced by Senator Brush into the New York Legislature for the purpose of preventing the sale of diphtheria antitoxin all over the United States in competition with private enterprise. The *News* has a full right to the expression of its convictions, but in reading its utterly unsupported statements, one cannot repress a feeling that it has rendered a sorry service to its friends. Another such advocate, one more defense in the same vein—and the New York Board of Health will be forever undone.

It is first claimed by the *News* that the New York Board of Health has provided the profession of New York City with "the best diphtheric serum to be had anywhere in the world." This statement is radically wrong. It has never been true. The board's serum does not surpass—has never surpassed that made in other laboratories. Better serums—more concentrated and powerful antitoxin—have been placed at the disposal of the New York profession by private producers; and among the very poorest serums sold in America is to be included the feeble product (100 units per Cc.) where-with the board has been able to compete successfully in price whilst bidding for patronage from Maine to California. The best serum ever produced and sold by the board possessed a potency not in excess of 500 units per Cc., whereas for nearly a year private manufacturers have been offering freely a 750 unit serum; parcels of 1,000 unit antitoxin have not been rare; and in one of the leading biological laboratories of the West, serum possessing the amazing power of 2,000 units per Cc. has been produced! So much for the scientific leadership of the board. What that body requires is greater diligence and modesty in investigation and learning, and less vanity in assuming to teach.

"All the producers of reliable antitoxin in this country are directly indebted to the laboratories of this department for assistance in the production of this remedy, if, indeed, they are not wholly dependent upon it for the instruction and encouragement they received there." This lofty statement has a fine sound; but it is untrue, every word of it. Boiling and Roux read their memorable and epoch-making papers at the International Medical Congress held in Buda-Pesth in September, 1894. On Nov. 7, 1894, work was begun, to our certain knowledge, in one large laboratory and at about the same time several others made their first inoculations. We are emphatically assured by the leading American producers that their work was well under way before they ever saw the laboratory of the New York Health Board; that they never borrowed so much as a single culture from them; that their work is under the direction of men who possess reputations as scholarly expert bacteriologists and teachers before antitoxin was ever

heard of; that desiring on one occasion a special culture which the board was supposed to possess, it was offered at an extortionate price and promptly declined; and they indignantly resent the insinuation that they owe the board anything but an annoying and unjust competition carried on with a subsidized product whose cost of manufacture is defrayed by the public purse.

It is not surprising that the same effrontery which declares without a vestige of truth or warrant that the laboratory of the board has "surpassed the laboratories of the world in producing the best grade of antitoxin" should make the preposterous claim that "with the glycerinated vaccine pulp now employed by the Board of Health such results are obtained in primary vaccination as to surpass all previous experience." The board has not produced a single vaccine product which has not been in extensive use for years all over Central Europe. This is especially true of the glycerinated vaccine lymph which has been long employed in Central Europe to the exclusion of every other vaccine.

"There is no other producer of vaccine virus in New York State." What broad and patriotic Americanism this ignoble statement evinces! Let the board wage its unjust and socialistic competition against the citizens of other States—what care we for the rights of other commonwealths in our great country! But at all events, let it not be forgotten that if New York has no private producers of vaccine, it is chiefly because private capital and private enterprise very properly shrink from a form of competition which, operating under a handsome appropriation, can fix its selling rates at pleasure while loftily disdaining all considerations of producing cost. True, there are no other vaccine plants in New York State—and in the pernicious activity of the New York Board must be sought the principal cause.

"All antitoxins other than diphtheria antitoxin are as yet largely experimental. No commercial house can afford to undertake and carry on such experimental investigations as are necessary to determine the methods of production and the value of the efficiency (sic!) of such unstable products." This statement is false, as we shall abundantly prove. It is a gratuitous slur upon our great manufacturing laboratories, and it meanly appeals to the base and narrow prejudice which small minds permit themselves to cherish against great scientific enterprises which shed luster on American industry.

Now to our proofs. The tetanus antitoxin is one of those which may be regarded as yet in the category of the "largely experimental," requiring further investigation, bacteriological and clinical. A number of very interesting reports, attesting its efficacy, have appeared in the best medical journals. In almost every instance the author has properly taken pains to give the name of the producer, and for every single mention of the antitetanic serum of the New York Board there have been at least five references to other brands! We could safely offer to show a larger ratio, but prefer to understate the glaring discrepancy. So, too, with the anti-streptococcal serum: for every mention of the board's product in trustworthy clinical reports, we guarantee to produce at least five favorable references to other brands. And we defy anybody to disprove the emphatic assertion that of the considerable quantities of anti-tetanic and anti-streptococcal serums employed in the United States, the product of the board is used in but an insignificant fraction of cases.

The statement that commercial houses cannot afford financially to carry on experimental investigations has been refuted so often and is so utterly untrue that its only office at the present time is to exhibit the amazing vitality of an adroitly managed falsehood. In the domain of synthetic chemistry, in manufacturing pharmacy, in the production of biological products, the prosecution of original research work is not only frequent and lucrative but absolutely indispensable, if the manufac-

er is to make front against the warfare of keen, able and untiring competitors. It is the condition of his growth. It is his only salvation. And even where it cures barren of direct financial returns, it yields a handsome if indirect profit in the form of augmented reputation. Thus, the invention of antipyrin, acetanilid, salicylic acid, the isolation of active principles from many important drugs; the introduction of new medicinal forms obtained in distant lands; the great progress achieved in rendering our pharmaceutical preparations more uniform and reliable; the introduction of physiological assay methods; the presentation of powerful drugs in forms which are shorn of untoward or dangerous after-effects; the production of concentrated antitoxins which only two years ago would have been regarded as laboratory curiosities—these are only a few of the fruits of those experimental investigations which commercial uses are pronounced unable to conduct. Is it not true that Germany owes its astounding industrial career to the wedding of commercial enterprise with scientific research—to the hosts of chemists, bacteriologists, engineers and physiological investigators employed in its manufacturing laboratories? And are our great captains of industry in America too blind or too stupid to low in their footsteps? American houses "financially able to carry on experimental investigation"—they are doing it constantly.

The News speaks, further, "of the high position (of the board) as an authority in pronouncing upon the quality of biologic products manufactured in other laboratories. And, finally, of its superb results secured in reducing the death rate in the city of New York to a percentage unparalleled in its history." More fine-sounding language than the Talleyrand sort—the kind that conceals truth. We have not a word to say in disparagement of either Mr. Biggs or Dr. Park. They are both able men and able bacteriologists. But they have their peers in every leading university in the United States. There are scores of expert bacteriologists in this country whose reputation on some disputed point would carry as much weight as the pronouncement of either one of these worthy gentlemen—indeed, much more weight, for having no personal interest in a commercial, serum-selling enterprise, their statements would be received as the more interested. It may also be asked, upon what biologic products have these "authorities" "pronounced?"

Is any one ever heard of their performing a series of comparative tests? What inferior serums have they examined? To what reliable brands have they graciously appended the stamp of their "authority?" In England the Government appointed an Antitoxin Commission which in due time pronounced most of the serum on the British market to be utterly weak and worthless. That would be a great service to science and humanity. Why, then, would our American "authority" failed to do likewise? Why does it not back up its pretensions by actual performance? Why does it justify the assertion that so many "pronouncing upon the quality of biologic products" is concerned, this self-constituted oracle is an ignominious failure?

As for the "superb results" in reducing the death rate in diphtheria in New York City, here we have another phrase parading as a fact. True, the serum treatment has lessened mightily the ravages of diphtheria in New York, as it has everywhere else. But the showing in New York City, the reduced death rate, the actual statistics, in no wise surpass—indeed, they do not equal—the relating to some other municipalities. We refer particularly to Chicago, where a pre-antitoxin mortality of 10 per cent. has been reduced by the employment of various brands of antitoxin to 6.7 per cent. during 1897! Let it be it from our thought to cast a slur on the antitoxin of the New York Board: some of its product is good; but it is idle and ridiculous to pretend that its

best serum is better than other reputable brands. We insist that its best serum does not equal, in point of concentrated potency, the best serums of private producers, and it has certainly not yielded the same brilliant service in effacing the death rate of the past.

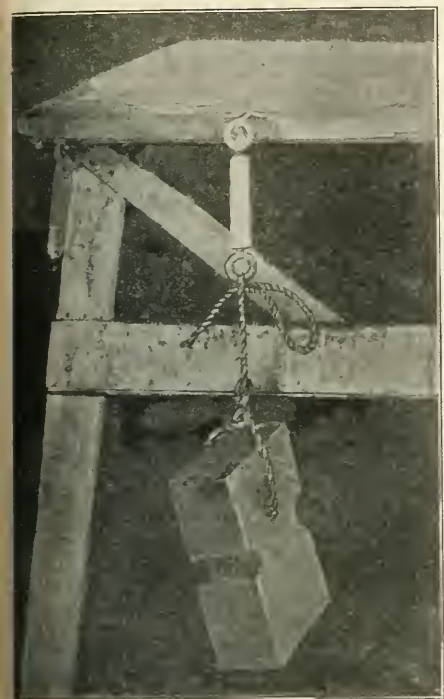
"As there are only three producers of diphtheria antitoxin in this country, the probabilities are that if the New York City Board of Health is restrained from manufacturing this product, the price will soon be placed at such a figure as to be beyond the reach of all except the very rich." Behold the great bugbear with which the board's partisans are frightening the heretics who do not believe that the municipality should embark in the drug business! Only three producers! We count four in the advertising pages of the News alone, to say nothing of the American agents for the Roux and Behring serums, or of the various municipalities, such as Boston, Philadelphia, and St. Louis, which produce serum for the use of their indigent sick. The probable increase in price, following the withdrawal of the New York Board from the general market, is a myth unworthy of serious discussion. Not only has the consumer's price for serum steadily declined, but, furthermore, we can state on the best authority that one of the largest producers is now contemplating a material decrease in the price, without regard to the fate of the board. The "antitoxin trust" will do service as a watch-cry or a bugbear, but it has no basis in fact.

The Brush bill, which is now being choked in the committee, does not prohibit the manufacturing of these toxins by the board of health, but it should. The bill leaves the board free to make all the antitoxine for the indigent sick of the city—this is also wrong, because the board can purchase for one-sixth of the price for manufacturing the amount required for this purpose.

This bill does not suppress the odious features of the board's work. It declares they can make all the serum required for suffering poor, just as our prisons may manufacture shoes and clothing for their own inmates or furniture for the offices of state functionaries, but they shall not be free to sell antitoxine to every druggist and doctor for consumption by patients who can afford to pay; nor will they go with a subsidized product to every municipality in New York State and in the United States and bid for their patronage in competition with houses that have their hundred thousands invested in producing laboratories. That is the essence of the Brush bill, and no honest, fair-minded man can gainsay it's justice nor the propriety of its enactment. But it does not go far enough. It should protect the taxpayer and save him many thousands per year by doing away with a large plant for manufacturing toxins and vaccine virus which can be procured for experimental work and for the poor of the city from no less than a half dozen laboratories of this and other countries for seven or eight thousand dollars. Let the board of health of New York city act as experts, and not as manufacturers. They will then command the respect of the profession and the pharmacists, and their usefulness to the community will be doubly enhanced, and the medical profession will give them their undivided support. A. M. PHELPS, M. D.

No. 62 East Thirty-fourth street, New York.

INVERSION OF IMAGES ON THE RETINA.—According to Nature (Phila. Med. Jr.) Professor George M. Stratton, of the University of California, recently made an experiment upon himself by wearing for eight days a mask fitted with lenses which invert the visual image, thus projecting it upon the retina in an erect instead of the normal inverted position. He soon learned to refer all objects to their correct positions—in other words, to see them right side up; but, on removing the apparatus at the expiration of eight days, everything appeared to be upside down at first. He therefore concludes that the seeing of objects right side up is due to a mental rectification of the visual image actually projected upon the retina.



OF FROZEN MERCURY WITH WEIGHT SUSPENDED.

face. An electric light was placed behind the glass vessel and the dancing of these spheres was a fascinating spectacle. The air remained distinct from the water and did not mix, as one might suppose it would. So nearly the same was the specific gravity of the two liquids that the most trifling change would alter the balance. Every now and then the plunges of the globules of liquid air would go deeper than before, until finally for a second the bottom of the vessel was reached. When one had reached the bottom the process was ended. These spheres of liquid air looked like glass marbles or balls of crystal. They were nearly an inch in diameter and absolutely colorless, and seen against the electric lamp glittered like jewels.

A number of curious and interesting tricks were performed to show the action of liquid air on various common substances. A beef steak was "cooked" until it lost its red color and became like a piece of slatey rock, which could be broken into chips with a hammer. Eggs, apples, onions, tomatoes and oranges were frozen into rocks which could be pulverized only by pounding. Similarly a piece of steel of the finest quality, when frozen in liquid air could be broken into fragments with an ordinary hammer. Tin, by immersion in the liquid air, was rendered as brittle and delicate as an egg shell, and could be crushed as easily in the hand. One of the most interesting experiments to show the intense cold produced by liquid air was the freezing of mercury. This material was cast in an iron mould into the form of a hammer, and with the mercury hammer so formed the experimenter drove nails through an inch board. A bar of mercury was frozen and then suspended from a rest with a seventy-five-pound weight attached. The mercury retained its solid shape and supported the heavy weight for fifteen minutes. A piece of felt saturated with liquid air was so quickly coated with oxygen, that when a match was applied it burned with the brilliancy of an arc electric lamp. In the liquid air carbon burned brilliantly with scintillating white sparks.

One of Mr. Tripler's prettiest and most interesting demonstrations was as follows: A thin glass tumbler

was half filled with the liquid air and then set in a basin of water. So intense was the cold produced by the evaporation of the air that a film of ice was quickly formed on the outside of the tumbler. When this shell was one-eighth of an inch thick it was detached from the tumbler, now empty, by pouring into it a little water. Into the ice cup thus manufactured Mr. Tripler poured an inch or two of liquid air. A burning match at the end of a strip of steel ribbon was dipped into the liquid; at once the steel itself began to burn, sputtering and scattering brilliant sparks. At last the steel literally burned in the liquid and became fused in the ice cup.

"There you have a very fine temperature contrast," said Mr. Tripler. "The burning steel represents about 2,000 degrees above zero; the ice cup 32° above, and the liquid air from 312 to 320 degrees below."

The explosive force of the evaporating liquid air was shown in a novel manner. A copper cylinder having a thickness of one-quarter inch was stood on end, and into it was poured an inch or two of the liquid air. A plug was made of a wad of paper; this was driven into the top of the cylinder with a hammer. After driving it in Mr. Tripler had barely time to step out of the way before an explosion occurred which was louder than any giant firecracker. The wad of paper was shot up to the ceiling with tremendous force.

After this series of tricks and demonstrations, Mr. Tripler said he would leave to the members of the Chemical Society to what uses this liquid could be put in chemistry. He wished to speak very briefly on the history of the manufacture of liquid air. He said the very beginning of its history might be found in the experiments with gases performed by Faraday. In 1878 Pietet had found that air was not a stable gas; that it could be reduced to another form in minute quantities. Then the matter had been taken up by the Royal Institute, and by some learned Russian experimenters in chemistry, Linde, in Germany, and various other experimenters, both here and abroad, have been working, in the words of Mr. Tripler, "through gases to liquid air."

Mr. Tripler says that the method employed by him to produce liquid air is in some respects original with him.



BURNING STEEL IN AN ICE CUP.

He claims that although Linde and others have used it, nevertheless he was the first to do so, and he believes that he produces liquid air in larger quantities and much more cheaply than any of the foreign chemists. He says that he produces from ten to fifteen gallons of the fluid with the expenditure of about one-half a ton of coal. He concluded:

"Now we have got the liquid, a liquid that boils without fire, the question now is to make it commercially, and to develop its uses and the services it can render to us. We are only just at the beginning in this. I believe that it can be made on a commercial scale, and that the uses to which it can be put are more numerous and would be of greater benefit to mankind than we to-day can possibly imagine."

There were two other papers on the programme, but as it was late, these were read by title only. They were, "Process for the Production of Photographic Prints on Textile Fabrics by Means of Adjective Colors," by Stewart F. Carter; and "The Determination of Tin in Tinplate and Roofing Tin," by Robert Job. After a vote of thanks to the speakers of the evening the meeting was adjourned.

EXAMINATION QUESTIONS.

BOARD OF PHARMACY OF THE CITY OF NEW

YORK, MARCH 21, 1898.

MATERIA MEDICA.

1. Give the official title of the following: Fowler's Solution, Donovan's Solution, Prussic Acid, Diluted Phosphoric Acid.
2. Name three official Oleoresins.
3. Give the botanical name of Quebracho. (b) What part of the plant is official? (c) Name the official preparations and their doses.
4. What is Iodine (b) Give the source from which Iodine is obtained. (c) Name the official preparations and their doses.
5. Name four mineral astringents each one having a different base.
6. Give the common name of Erythroxylon. (b) What part of the plant is used? (c) Name the alkaloid and dose.
7. What is Hydrastis? (b) Give the official preparations of Hydrastis and their doses.
8. Is Oil of Thyme a fixed or volatile oil? (b) Give the botanical name of the plant and state from what part of it the oil is obtained.
9. Name three official drugs Natural Order Umbelliferae.
10. Give the common name of Cimicifuga. (b) What part of the plant is official? (c) Name the official preparations and their doses.
11. From what are the following obtained: (a) Pilocarpine, (b) Cocaine, (c) Eserine, (d) Sparteine.
12. To what does Ipecacuanha owe its emetic property?
13. What is Aspergum? (b) Give the official preparations and their doses.
14. What is the source from which Phenic Acid is obtained?
15. Give the common names of the following: (a) Ihus Glabra, (b) Sambucus, (c) Matricaria, (d) Marrubium.

TOXICOLOGY AND POSOLOGY.

1. Define: (a) toxic, (b) posology, (c) irritant poison, (d) demulcent?
2. What is meant by (a) chemical antidote, (b) physiological antidote?
3. What sodium salt should be employed in Nitrate of Silver poisoning, and why?
4. What poisonous drug is liable to be mistaken for Epsom Salt, and what is the antidote for that poison?
5. What are the antidotes for (a) Arsenic, (b) Phosphorus? (b) What treatment should be employed for Phosphorus poisoning? (c) Should oil be used for such poisoning?
6. What does the Charter of the City of New York require of a pharmacist who sells: (a) Opium, (b) Strychnine, (c) Corrosive Sublimates, (d) Arsenic, (e) Carbolic Acid?
7. How often should averages doses of most medicines be repeated?
8. How do hypodermic and rectal doses of medicines usually compare in size with ordinary mouth doses of the same medicines?
9. What is the dose of: (a) Strychnine? (b) Sulphate of Atropine? (c) Digitalin? (d) Muriate of Pilocarpine? (e) Codeine?
10. What is the dose of: (a) Antipyrine? (b) Naphthalene? (c) Ingulvin? (d) Donovan's Solution? (e) Croton Oil?
11. What is the dose of: (a) Salicylate of Sodium? (b) Paraldehyde? (c) Ext. Aconite? (d) Ext. Belladonna? (e) Ext. Nux Vomica?
12. What is the dose of: (a) Tr. Strophanthus? (b) Tr. Hyoscyamus? (c) Tr. Kino? (d) Tr. Lavender Co.? (e) Tr. Cannabis Indica?
13. What is the dose of: (a) Carbonate of Ammonium? (b) Acetate of Potassium? (c) Bromide of Potassium? (d) Hydrchlorate of Quinine? (e) Phosphate of Sodium?
14. What is the dose of: (a) Spirit of Nitrous Ether? (b) Compound Spirit of Ether? (c) Aromatic Spirits of Ammonia? (d) Spirit of Chloroform? (e) Spirit of Peppermint?
15. What is the dose of: (a) Wine of Colchicum Root? (b) Wine of Ipecac? (c) Wine of Opium? (d) Acetate of Lead? (e) Valerianate of Zinc?

PHARMACY.

1. Name three salts, giving official title, which are very soluble in water.
2. What is an emulsion? Name two varieties.
3. Describe in detail the pharmacopoeial method for making an infusion.
4. Name three olutment bases in common use. Give advantages and disadvantages of each.
5. How is the official tincture of nux vomica prepared? What per cent. of alkaloids should it contain?
6. Give the unabbreviated official title of: (a) Lead Plaster, (b) Plummer's Pills, (c) Spirit of Mindererus, (d) Basham's Mixture, (e) Goulard's Extract.
7. What difference in behavior is noted in case of tincture of Iodine and Lugol's solution, upon the addition of water?
8. Name two official tinctures that are made by maceration?
9. Name a good solvent for the following: (a) Sallicylic Acid, (b) Lead Acetate, (c) Sulphur, (d) Menthol, (e) Red Lead, (f) Mercury.
10. What do you dispense for protoiodide of mercury? Give official title of the salt.
11. How is "Cold Cream," U. S. P., prepared?
12. Why is aromatic sulphuric acid employed in preparing infusion of cinchona?
13. Ether: Give percentage strength, and state how made. Name its official preparations, and give its general chemical and physical properties.
14. What changes occur in oleate of mercury? To what causes may they be attributed?
15. A pharmacist desires to prepare 1,000 cc. of tincture of opium, official strength. How much powdered opium containing 18 per cent. of morphine should be employed?

CHEMISTRY.

1. Name two elements that exist in the gaseous form.
2. Show by an equation how hydrogen can be obtained.
3. What acid is obtained from argols? Name two double salts of this acid, which are official.
4. Give a chemical test to distinguish calomel from corrosive sublimate.
5. Write the chemical formulae of three acids possessing corrosive properties.
6. State what new chemical compound is formed in the preparation of (a) Basham's Mixture, (b) Bland's Pills.
7. Iodine: Source, chemical and physical properties, test of identity, and the official titles of two preparations into which it enters.
8. Write the chemical formula of prussic acid, and give a test of identity.
9. Write formulae of three compounds which have (a) an acid reaction, (b) an alkaline reaction.
10. Show by equation the reaction that takes place when charcoal and sulphuric acid are heated together.
11. What official acid is made in the manner indicated in the preceding question?
12. Write the formulae of any three organic compounds.
13. Describe in detail a test by means of which you can determine the presence of arsenic in Fowler's solution.
14. What compound results when bismuth nitrate is added to water?
15. What is the source of phenol? Give its official title, its properties and its chemical formula, and state how it behaves with solutions of albumen and gelatine.

THE DRUG CLERK IN SWEDEN.*

BY O. W. ØSTERLUND, '99.

Drugs and chemicals have been used from time immemorial in Sweden, but perhaps the first drug store was the Hofapoteket "Lejonet," of Stockholm, established in 1575.

In the first place, one who chooses the practice of pharmacy as his profession in Sweden starts by going through the ordinary educational branches in a public or private school, and then enters a high school or college where the higher branches of mathematics, geography, physics, physiology, zoology, the fundamental branches of chemistry, botany and even theology are taught, as well as the Greek, Latin, German and the French or English languages. After spending six or seven years in this manner he is regarded as being coarsely educated, and now decides which he wishes to be, clergyman, lawyer, doctor of medicine, civil engineer, pharmacist or veterinary surgeon.

Let us say that the decision is for pharmacy. The tyro then commences a course of study in chemistry, botany, materia medica and certain branches relating to medicine. For a period of from three to four years these studies are pursued, and then the student may come up for the first examination. In case of failure he

*From an address delivered before the Beta Psi Society, Philadelphia College of Pharmacy. Reprinted from Alumni Report.

may come up again for examination in three or six months—the same candidate cannot be re-examined more than three times.

Well, the studies are further pursued along the same line, and several other examinations must be taken.

Now, unlike the practice in other lands—notably ours—the drug clerk cannot call on his *pater familias* (if his father lives long enough to see his son a drug clerk) to furnish the necessary funds, and start him in the drug business on a good corner. He is under the national law and the king, and must comply with the Government regulations.

Serving faithfully and being well liked, he must now wait for the death of his preceptor or other vacancy, for which there will be several applications; and the board of medical men in charge or the king will select the one whom they regard as most suitable to conduct it. Of course, as a clerk or "provisor"—as he is called—he is highly respected and not expected to do a porter's work. He does not understand the sale of soda water, cigars, paints, etc., nor is he expected to know all the street car lines, read and write letters, and furnish all kinds of general information which, alas! alack a day, is expected from the druggist in these great United States.

The many years of faithful study and hard work lead to the result that Swedish pharmacists are comparatively few in number, and rarely under forty or forty-five years of age.

The Swedish system of pharmaceutical education is certainly to be appreciated, and has its advantages. It must broaden one's mind to have such a broadly built educational foundation. But such an education, extending as it does through the best years of a man's life, would not pay in busy America, where a man expects to be rich before he has made a half century run.

No, the bright, quick, active, aggressive man who, with fair general education, concentrates his mind in the direction of theoretical and practical pharmacy and allied branches, and works for all he is worth, becomes more familiar with the pharmaceutical demands as they exist in this country, and will make a success here where the Swedish pharmacist would fail. In this country, education, like business, is becoming specialized; the specialist is a man of the present and the future. I must confess that I prefer the American plan, and, in my opinion, it better suits the temperament of the American people, and the conditions of American life.

ABOUT KAURI.

Mark Twain, says Chemist and Druggist, is authority on this. He says, in "More Tramps Abroad": "It is 'om Auckland that the kauri-gum is shipped. For a long time now about 8,000 tons have been brought into the town per year. It is worth about \$300 per ton, unsorted: assorted, the finest grades are worth about 1,000. It goes to America chiefly. It is in lumps, and hard and smooth, and looks like amber; the light colored like new amber, and the dark brown like rich old amber. And it has the pleasant feel of amber, too. Some of the light-colored samples were a tolerably fair counterfeit of uncut South African diamonds, they were perfectly smooth, polished and transparent. It is manufactured into varnish—a varnish which answers for copal varnish, and is cheaper. The gum is dug up at the foot of the tree; it has been there for ages. It is the sap of the kauri-tree. Dr. Campbell, of Auckland, told me that he sent a cargo of it to England fifty years ago, and it nothing came of the venture. Nobody knew what to do with it, so it was given away at £5 per ton to light fires."

Some people have difficulty in telling when Mark Twain is serious, is the Chemist and Druggist's opinion. He is nearly ninety-nine parts funny, and one part solemnity. It generally happens that the odd part

strikes the thing of which the reader knows about as much as the genial humorist, and the first and last thought is, "how near the truth he gets." Then he begins to wonder if Mark Twain is funny at all. It is the fact that half a century ago the first consignments of kauri found no market, and it is said that for several years the article was not worth the warehouse rent in London, and came from New Zealand as ballast.

The kauri fields are situated in the northern part of New Zealand, and are partly owned by Maoris and partly by the New Zealand Government.

The primeval *Dammara australis* dropped the resin centuries ago, and the accumulations of ages lie several feet beneath the surface. The descendants of the ancient *dammara*s still yield resin, but it is useless for varnish making, because it takes too long to harden—say, a few decades. Some 2,000 Maoris are engaged in kauri digging, and there are whites, too, "mostly social wreckage from Europe," wrote one who is taken more seriously than Mark Twain, but many gold miners, temporarily in difficulties, are glad to dig for these low-water diamonds. Some kauri buyers in London will have it that whenever there is a gold "boom" the price of kauri gum advances through lack of diggers. We mention that opinion for what it is worth, but it is certain that for a long time the market price of kauri has been tending upwards.

These potential millionaires start out with a steel rod—all the shooting-iron they can afford.

The kauri insists upon being hunted for. It lies low, and does everything in its power to elude the white man's grasp. The Maori smells it. Mark Twain does not say so, but would have done had he thought of it. With the steel rod the millionaire probes along, and when he strikes the quarry he unearths it with prosaic pick and shovel. When they get tired of digging, the men sit down and scrape debris off the resin with a knife. It is hard work; so when they have as much as they can carry they take it into the nearest town and drink it. About five hundred million pounds of kauri gum have, from first to last, been spread over the world as varnish and linoleum, and considerably less has gone to clothe the female form divine in the guise of silk. At present there is more than a million pounds lying in the port of London, which represents about a year's consumption in this country. The United States buys more; in fact, the output is what Mark Twain says. Kauri is also known under the names *kowrie* and *cowdi*. The latter is the original and, seemingly, correct name. There is another word which sounds similar—we mean the shell which passes in many places as current coin. This *cowrie* loves to bask under the shade of the mighty tree; but that usually happens in Central Africa, where the sable beauties wear a string or two of *Cowrie* shells—and little else. This has no connection with kauri.

STARCH IN OPIUM.—The frequently observed presence of starch in gum opium as well as powder is discussed by W. Kathe, who is of the opinion that it should not be looked upon as an adulteration, so long as the opium contains the required per cent. of morphine. Since starch has no pronounced physiological action, it is one of the most available substances for adjusting high-grade opium to the pharmacopoeial standard. It is readily detected under the microscope by the iodine reaction. Although starch has long been found in Persian opium, it is only of late that it has been noticed in the product of Asia Minor, which comes into the market by way of Smyrna. (Südd. Ap. Ztg.)

ACETYLENE GAS is not exploded by an electric spark under ordinary atmospheric pressure, nor under a pressure of 2 atmospheres. If, however, the pressure is increased to 3 atmospheres, the electric spark causes a violent explosion. The greater the pressure, the more readily the gas is ignited and the greater the violence of the explosions. It follows that acetylene, when handled with proper care, is not more dangerous and explosive than ordinary illuminating gas, but that explosions, when they take place, may do more damage. (Südd. Ap. Ztg.)

PHARMACY.

CREOLALBIN is a synonym for crealbin, a creolin-albumin compound for internal use.

LARGIN is a new antiseptic prepared by Prof. Finger and intended for gonorrhoea. Its composition is not known.

AXI is a yellowish fat, melting at 35° C., prepared from a Mexican insect, *Coccus Axini*. It is recommended for prurigo.

TANNOPIN is another name for tannin, a condensation product of tannin and urotropin which is used for intestinal catarrh.

ALMADINA is the inspissated milk juice of a Euphorbia indigenous to West Africa. Nothing is known yet of its medicinal action.

PROMPIN (di-ethyl-ketone) is a mobile, easily soluble liquid, given in doses of 0.5 to 3 Gm. (8 to 45 grains) with peppermint water as hypnotic.

EUPATORIUM TRIPLINERVE.—The leaves of this plant furnish an infusion of aromatic, bitter taste, which is used as tonic and stomachic.

PERCO is a trade name for Peru cognac, a solution of the active constituents of balsam Peru in cognac, recently proposed as a remedy for tuberculosis.

PURPHEIDINE GUAIACOLATE occurs in needles or plates, which are soluble in water to 3.5 per cent. In physiological action the salt resembles its components. (Ph. Post.)

OZONE SOLUTIONS for medicinal purposes are prepared, according to a recent patent, by saturating etheral oils, either pure or in solution, particularly oil of lemon, with ozone. (Ph. Post.)

ACETOL is a remedy for toothache, found by Dr. Aufrecht to consist of acetic acid 8.46, alum 3.07, and water 88.5 per cent., with small quantities of the essential oils of sage, peppermint, and clove. (Ph. Ztg.)

PARAFORM COLLOIDION.—A mixture of colloidion with 5 per cent. of paraformaldehyde is used by Unna in treating small swellings, which subside through the action of gaseous formaldehyde, which is gradually formed. (Ph. Post.)

CROTON is the collective name of a protoplasmic poison obtained from the seed of *Croton tiglium*. It is soluble in a 10 per cent. sodium chloride solution, and acts physiologically by paralyzing the brain centers and affecting the action of the heart. (Ph. Post.)

PHENOL SODIUM SULPHORICINATE is a yellowish-brown syrupy liquid used in the treatment of throat affections. It can be used in combination with phosphorus, sulphur, potassium iodide, naphthalin, or pyrogallol acid. (Ph. Post.)

AMMONOL SALICYLATE, which is stated to have the composition of ammonium-phenyl-acetamide salicylate, is recommended as a desirable substitute for the customary headache preparation in the treatment of nervous anemic females, in doses of 0.5 Gm. (8 grains).

ARGENTOL (*Argentum Chinaseptolicum*) is split up in presence of septic matters into oxy-quinoline, which acts as an antiseptic, and metallic silver. Its principal use is in gonorrhoea, in which it is prescribed in form of dusting powder, ointment, or emulsion. (13000 to 1:10000). (Ph. Post.)

DR. LATON'S REMEDY.—This preparation, which is recommended for gout and rheumatism, is a dark, reddish-brown tincture of aromatic odor and of bitter and burning taste. It forms an opalescent or milky mixture with water. The composition is kept secret, but according to Dr. Aufrecht the preparation consists of tinctures of colchicum, benzoïn, capsicum and clove. (Ph. Ztg.)

OIL OF GYNOCARDIA, also known as *Chaulmugra Oil*, is used in China, Japan and India as a remedy for leprosy. It is best given in gelatin capsules containing 0.5 Gm. (8 grains) each, after meals. The dose, to begin, is one capsule and is gradually increased until 30 capsules are taken daily. This quantity is then taken daily for at least a year. (Ph. Post.)

PREPARATION OF HOMATROPINE.—A recently patented process consists in heating a mixture of tropine (7 p.), amygdalic acid (10 p.), and water (2 p.) on an oil-bath to 110 to 112° C. and passing a stream of hydrochloric acid gas through it for 3 or 4 hours. The alkaloid, formed under these conditions, is purified in the usual manner. (Zeisch, ang. Chem.)

COLIC MIXTURE.—The following formula is recommended:

- Spirit of nitrous ether	5 parts
Tincture of asafoetida	5 parts
Extract of aloes	40 parts
Glycerin	80 parts
Castor oil	80 parts
	(Ap. Ztg.)

HYDROFLUORIC ACID AND ITS SALTS are effective antiseptics and are particularly valuable for the destruction of bacteria that cause decay, thus acting as preservatives. The potassium salt is more effective than the sodium salt; the fluorides of barium, calcium, magnesium, aluminum and iron in particular have strong antiseptic powers. Ammonium fluoride is a comparatively feeble antiseptic. (Ph. Post.)

ALIBOUR WATER is, according to "La méd. inf.," an antiseptic solution used in France since the 16th century and is particularly useful in the treatment of purulent and other wounds. It consists of zinc sulphate 7 parts, copper sulphate 2 parts, saffron 0.4 part, and camphor water 600 parts. If the application of the solution is painful, it should be diluted, until it causes only a slight itching. (Ph. Post.)

BENZOIODHYDRIN (glyceryl chlor-iodo-benzoate) is a brown-yellow fatty substance insoluble in glycerin, and soluble in alcohol, ether, and petroleum ether. When heated to 100° C. (212° F.), it is decomposed with separation of iodine. It is proposed as a substitute for potassium iodide. Mixed in proportion of 32.5 parts with 1,000 parts of sugar, a teaspoonful of the mixture is equivalent to 1 Gm. of potassium iodide. (Ph. Post.)

PREPARATION OF ARTIFICIAL CAMPHOR.—Hydrochloric acid gas is passed into oil of turpentine, the product of the reaction mixed with a dilute solution of caustic alkali and distilled. The distillate consists of both liquids and solids, which are more completely separated from each other by means of a freezing mixture. The products are employed in the manufacture of celluloid, pegamoid, soaps, varnishes, antiseptics, perfumes, etc. (Ap. Ztg.)

IODIPIN AND BROMIPIN are addition products of sesame oil with iodine and bromine, respectively, and contain 10 per cent. of either substance. They are yellowish preparations, having a pure oily taste and resembling fatty oils in their properties. The iodine and bromine readily split off in the human organism. These compounds are recommended in syphilis, scrofula, etc., in place of the usual bromine and iodine preparations, in doses of a teaspoonful three times daily. (Ph. Post.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Spots on Cigar Wrappers.

(J. G. W.) See *Era* of April 15, last year, page 453.

Chewing Gum.

(C. J. T.) See this journal, Oct. 15, 1896, page 497, and Dec. 23, 1897, page 958.

Resinol.

(R. B. P.) See this journal, Nov. 11, 1897, page 720, and Feb. 3, 1898, page 174.

Emulsifier.

(R. B. P.) We cannot give the formula for the proprietary emulsifier you name. Some general remarks with formulas for emulsifying agents used in proportionately small quantities are given on page 958 of our Dec. 23 issue of last year.

Tasteless Castor Oil.

(C. S. D.) Tasteless or sweetened castor oil is prepared by thoroughly washing the oil with hot water and incorporating sufficient ($\frac{1}{4}$ to $\frac{1}{2}$ per cent.) saccharine to impart a sweet taste. The oil is then flavored by adding small quantities of oil of cinnamon and extract of vanilla or other suitable flavoring substances.

Antipyrin and Calomel.

(B. A. C.) Calomel and antipyrin should never be prescribed together even though intended to be dispensed in powder form; they are incompatible, the absorption of moisture or presence of water causing the formation of corrosive sublimate. The equation for the reaction is thus indicated: $6\text{HgCl} + \text{H}_2\text{O} + 2\text{C}_{11}\text{H}_{12}\text{N}_2\text{O} = 2\text{Hg} + \text{Hg}_2\text{O} + 2\text{HgCl}_2 + 2\text{C}_{11}\text{H}_{12}\text{N}_2\text{OHCl}$. Werner, in experimenting upon this reaction, found that when one gram each of calomel and antipyrine were triturated together, 100 cc. of water added, and the mixture allowed to digest for three hours at 35° to 40° C., 0.0232 gram of corrosive sublimate was formed. For an outline of his experiments, see this journal, Feb. 18, 1897, page 190.

Seiler's Antiseptic Solution.

(J. F. R.)	
Sodium bicarbonate	1 ounce
Sodium borate	1 ounce
Sodium benzoate	20 grains
Sodium salicylate	20 grains
Eucalyptol	10 grains
Thymol	10 grains
Menthol	5 grains
Oil gaultheria	6 drops
Glycerin	8½ ounces
Alcohol	2 ounces
Water, q. s. to make	16 pints

Dissolve the salts in 8 pints of water, and the eucalyptol, thymol, menthol and the oil of wintergreen in the alcohol. Mix the two solutions, add the glycerin and enough water to complete the measure, allow to stand 24 hours and filter.

Labeling Fowler's Solution.

(J. F. R.) The pharmacy law of your State (Rhode Island) specifically exempts the labeling and recording the sale of poisons, as such, when dispensed upon the prescription of a reputable physician. Such prescriptions, however, are required to be kept on file in a book and numbered in the order of receipt by the pharmacist,

for five years. In the absence of laws enumerating the poisons which may thus be dispensed without bearing a poison label, many authorities hold that all poisons though dispensed upon the order of a physician, should be labeled "poison" and the sale recorded in the manner required in the general poison law. A decision in a case in Tennessee some years ago, where a druggist was prosecuted for dispensing a poison on a prescription without labeling it other than the physician directed, would seem to uphold this view. It is not customary, however, to label poisons prescribed by physicians as "poisons."

Fireproof Coating for Wood Shavings.

(O. O. M.) The following fireproof coating used on shingles may answer your purpose:

Zinc sulphate	20 pounds
Alum	20 pounds
Caustic potash	8 pounds
Manganic oxide	8 pounds
Hot water	32 gallons
Dissolve and add	
Sulphuric acid	8 pounds

Pack the shavings in a barrel and fill with the liquid; allow them to soak 3 hours, then dry. The solution may be used several times.

There are many chemicals recommended to render wood unflammable such as silicate of sodium, common salt, ammonium sulphate, sodium tungstate, etc. Each is used by dissolving it in water and soaking the wood, previously dried, in the solution.

Liquid Silver Polish.

(B. C. O.) Try one of the following:

(1) Prepared chalk or whiting	2 ounces
Water of ammonia	2 ounces
Water, enough to make	8 ounces
(2) Oxalic acid	1 ounce
Crocus marts	2 ounces
Whiting	4 ounces
Water, to make	1 pint

Mix, and shake before using. This preparation may be used dry (omitting the water), or applied with a little oil with rubbing, and rubbed dry with whiting.

(3) Mix 8 ounces prepared chalk, 2 ounces turpentine, 1 ounce alcohol, 4 drams spirits camphor and 2 drams water of ammonia. Apply with sponge and allow to dry before polishing.

(4) Cyanide potassium	8 ounces
Alcohol	1 ounce
Water of ammonia	1 ounce
Blue vitriol	½ ounce
Glauber salts	1 ounce
Soft water	2 gallons

Immerse the silverware in the bath for a few minutes, rinse with clear water and polish with chamois skin or flannel.

(5) Use a saturated solution of hyposulphite of soda, to which a little bolted whiting has been added. Apply with brush or cloth, and rub till the tarnish is removed.

Ink Eraser.

(Eradicator.) Here are some formulas from the *Era* Formulary:

(1) Immerse blotting paper or any similar material in a hot concentrated solution of citric acid, roll it into a pencil, and coat the larger portion of it with paper or lacquer. Moisten the eraser with water, and rub over the ink to be removed. Drop upon the ink spot a drop of water containing chloride of lime. The ink immediately disappears.

(2) Mix equal parts of oxalic acid and tartaric acid in powder. When to be used dissolve a little in water. It is poisonous.

(3) Dissolve equal parts cream of tartar and citric acid in water.

(4) Cold aqueous or acetic acid solution of calcium hypochlorite, bleaching powder, eau de Javelle.

(5) Alum, amber, sulphur, saltpeter, of each, 1 part,

in fine powder. Mix. This forms an excellent mixture for the removal of ink spots and writing on paper.

(6) In 2 quarts of water dissolve 4 ounces of citric acid, and then add from 6 to 8 ounces of a concentrated solution of borax. This is solution No. 1. To prepare solution No. 2, add 2 quarts of water to 3 pounds of chloride of lime, shake well and set aside for about a week; decant, and add from 6 to 8 ounces of concentrated solution of borax. This composition is used by saturating the ink spot with solution No. 1, removing excess of liquid with a blotter, and then applying solution No. 2. When the stain has disappeared, apply the blotter, and wash the spot by the alternate use of clear water and blotting paper.

(7) If the color is anilin red, try a solution of 7 parts sodium nitrate and 15 parts dilute sulphuric acid in 500 parts water, applying to the spot or writing to be erased with a camel's hair brush, and rinsing carefully.

Elixir Hydrastis and Avena Compound.

(C. T. L.) The following formula is constructed upon the outline you submit:

Hydrastis	320 grains
Oats, unhusked	736 grains
Xanthoxylum	640 grains
Sodium bicarbonate	640 grains

Reduce the crude drugs to a moderately coarse powder and mix with the sodium bicarbonate; moisten the mixed powders with a menstruum composed of 1 part glycerine, 3 parts water and 6 parts alcohol, and macerate for 36 hours. Transfer to a percolator in the usual manner and, using a menstruum as given above, percolate until 6 ounces of product are obtained. To this add enough compound elixir of taraxacum, N. F., to make one pint. Or a similar preparation may be made by employing instead of the crude drugs the corresponding fluid extracts, thus:

Fluid extract hydrastis	320 minims
Tincture avena sativa (1:2)	3 fl. ounces
Fluid extract xanthoxylum	640 minims
Sodium bicarbonate	640 grains
Compound elixir taraxacum, enough to make	16 fl. ounces

Mix the liquids, add the sodium bicarbonate and compound elixir of taraxacum and allow the mixture to stand forty-eight hours, occasionally agitating, then filter.

Polish for Bowling Alleys.

(J. C. S.) Nearly every person who has the care of a bowling alley has a method of "his own" and the particular preparation used varies with the individual. We have been told to use boiled linseed oil with lots of "elbow grease," shellac varnish, wax polish similar to that employed on dancing floors, etc. A number of proprietary preparations have also been recommended for the purpose. Here are two or three formulas which have been suggested, though others might be given:

(1) Yellow wax	4 ounces
Yellow soap	2 ounces
Water	50 ounces

Boil with constant stirring and add

Boiled oil	5 ounces
Oil of turpentine	5 ounces
(2) Pale linseed oil	1 quart
Lac varnish	8 ounces
Wood alcohol	8 ounces

Mix well before using.

(3) Beeswax	1 pound
Pearl ash	6 ounces
Hot water	1 quart

Dissolve the pearl ash in the hot water, add the wax and simmer in a suitable vessel for an hour. Allow to cool, skim off the wax and work into a paste.

In addition to the above we suggest you look upon some of the floor polishes which have been published in previous volumes of the Era. One informant tells us a good light colored preparation of this character is about as good as any polish for the purpose.

Liquid Soap.

(L.) Liquid soaps are solutions of soap in alcohol, water, glycerine, etc., put up in fancy forms, for cosmetic or medicinal purposes. The simplest way to make it in small quantities is to take some good soft soap and thin it down with alcohol. If for toilet purposes, add about 19 per cent. of glycerine and perfume to suit. Following are some formulas from various sources:

(1) Sweet oil	7 parts
Caustic potash	1 part
Rose water, a sufficient quantity to the proper fluidity.	

Rub the oil, alkali and a little of the water together in a warm mortar until united, then add the remainder of the water as required.

(2) Mix one part caustic potash dissolved in an equal weight of water, and four parts olive oil and one-fourth part of alcohol. Shake all together thoroughly for ten minutes. Stir the mixture repeatedly during the next hour, then mix with an equal quantity of water, and after letting stand for several days, filter. If it is desired to increase the disinfectant properties of this soap, incorporate some carbolic acid.

(3) A formula given by a German writer for liquid glycerin soap is the following:

Olein	500 parts
Alcohol	100 parts
Solution potash, 33 1/3 per cent.	280 parts

Heat in a closed vessel by means of a steam bath for half an hour, agitating frequently, then add a solution of Potassium carbonate

50 parts	
Water	100 parts

Continue the heat until a sample is found to dissolve clear in hot water. To this soap add

Glycerine	1,570 parts
-----------------	-------------

After standing a number of days the preparation may be filtered.

(5) Potassa soap	30 grams
Glycerin	30 grams
Simple syrup	30 grams
Alcohol	10 grams
Oil cinnamon	
Oil geranium	
Oil wintergreen	
Oil sassafras, of each	2 drops
Oil cloves	1 drop
Oil bitter almond	1 drop
Oil citronella	1 drop
Oil bergamot	6 drops
Tincture musk	5 drops

Mix and filter after standing a few days.

Some formulas for perfuming the above and similar combinations may be found in this journal, Jan. 21, 1897, page 79.

GELATIN AS HEMOSTATIC.—In a solution of 7 Gm. of sodium chloride in a liter of water 5 to 10 per cent. of gelatine is dissolved, the solution filtered and sterilized by exposing to a current of steam for 30 or 40 minutes. So prepared, the solution keeps unchanged for weeks and is an excellent hemostatic. If it is to be used for nose bleeding or hemorrhages of the uterus, it is well to add 0.1 per cent. of corrosive sublimate, or 1 per cent. of carbolic acid. For application to the intestines toxic substances must, of course, be avoided. The solution solidifies on cooling, but readily melts on placing in a bath of warm water. It is employed in form of injections and saturated tampons of gauze. For nose bleed the nasal cavity is first washed out with sterilized water and a plug of cotton or gauze, saturated with the gelatin solution, inserted. It should not be used too warm, as the coagulating effect would be weakened. (Klin. Wochensh., through Ap. Zig.)

COLCHICISAL (colchicine salicylate) is a yellow, amorphous powder, soluble in water, alcohol and ether. It is recommended for arthritis, rheuma and gout, in doses of 0.00075 Gm. (1-100 grain). (Ph. Post.)

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Ellas H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblentz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Wilber G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Ph.M.B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M.D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 59.

Inorganic Chemistry,

Secondary Group of Alkaline Earth Metals.

ZINC, CADMIUM, MERCURY.

	Symbol.	Valence.	Atomic Weight.	Specific Gravity.
Zinc,	Zn.	2	65.1	7.12
Cadmium,	Cd.	2	111.5	8.65
Mercury,	Hg.	1, 2	199.8	13.59

These three metals constitute the secondary group of the alkaline earth family.

In this as in preceding groups we may notice a marked change in physical and chemical properties with the increase in atomic weight. All three exhibit strong metallic qualities, which become more marked as the atomic weight rises. Zinc, by its solubility and the solubility of its hydroxide in the caustic alkalis, displays its power to act as a non-metal in the presence of a stronger base, while mercury always takes the part of a base.

All the metals are fusible and volatile at moderately high temperatures, both fusing and boiling points decreasing as the atomic weight rises.

Zinc fuses at 433° C. and boils at 940° C.

Cadmium fuses at 320° C. and boils at 760° C.

Mercury fuses at -38.8° C. and boils at 357° C.

All of the metals are bivalent to oxygen. Mercury also forms an important series of univalent salts.

ZINC.

Symbol Zn. Valence 2. Atomic Weight 65.1. Specific Gravity 7.12.

Historical.—Though not acquainted with zinc in the free state, the ancients were familiar with brass, an alloy of zinc and copper, which, according to Aristotle, they obtained by fusing the latter metal with a peculiar earth found on the shores of the Black Sea. The ore which was capable of effecting this change in copper was the native zinc carbonate, variously known as cadmia, calamine, rutia, etc.

The word *zinken* seems to have been first used by Basil Valentine in his "Triumphal Car of Antimony." The first distinct recognition of zinc as a kind of metal seems to have been by Paracelsus, though for a long time afterwards it was confounded with tin, of which it was

thought to be a variety, and also with bismuth. Its introduction on the commercial scale first occurred in England during the early part of the eighteenth century.

Natural Occurrence.—Zinc is rarely, if ever, found native. The principal ores are the carbonate, ZnCO_3 , known as zinc spar or smithsonite, the sulfid or zinc blende, ZnS , and the red zinc oxid, which latter derives its color from the presence of manganese. These ores are found in many localities in both the old and the new world.

Preparation.—The metal is generally obtained by heating the roasted ore with charcoal or powdered coal in retorts or muffles of earthenware. The carbon combines with the oxygen, and the reduced metal vaporizes and is condensed outside the furnace. Commercial zinc is always impure, containing iron, carbon, arsenic, antimony, lead, silver, cadmium, etc.

Description and Physical Properties.—Zinc is a rather hard, brittle metal, bluish white, and of a brilliant luster on unoxidized surfaces.

It exhibits its greatest malleability at 100° to 150°, between which points it may be rolled into sheets or drawn into wire. At high temperatures it again becomes brittle, and at 200° to 250° may be easily powdered.

Chemical Properties.—In moist air it slowly becomes coated with a thin film of oxid, which then acts as a protection to the metal beneath. When heated to a sufficient temperature in the air it burns with a brilliant white light, forming wool-like tufts of oxid, known to the old alchemists as "philosophical wool." Zinc is soluble in dilute acids and fixed alkalis. Chemically pure zinc dissolves in acids with difficulty, but if to a mixture of zinc and acid a few drops of a solution of platinum chlorid or cupric sulfate be added the evolution of hydrogen takes place rapidly, due to the precipitation of platinum or copper on the zinc, and the production of local galvanic currents.

The metal has an extensive use in the arts. With copper it forms the alloy known as brass, and with nickel

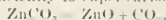
and copper German silver. Besides a multitude of other uses, it is largely employed as the positive plate in voltaic batteries, and as a protective coating for iron. Iron when protected in this manner is known as "galvanized."

Powdered zinc, or zinc dust, is largely used as a reducing agent in inorganic chemistry. In the granulated form it is used for the production of hydrogen, as in the Marsh test for Arsenic. Zinc is also used in dentistry as a constituent of amalgams, and in the formation of dies and counter dies.

COMPOUNDS.

All of the compounds of zinc, except the oxid when hot, and the Rinman's green hereafter referred to, are colorless. Many of the salts of zinc are soluble in water, and all are poisonous and emetic.

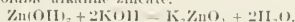
Oxygen Compounds.—When zinc is burned in air it forms the oxid, ZnO , which is also produced when the carbonate is ignited sufficiently to expel carbon dioxide.



Zinc oxid is a soft, white or cream tinted powder which becomes yellow when heated. Finely ground with linseed oil it forms the pigment known as zinc white, which, though it lacks the covering power of white lead, possesses the advantage of not blackening through exposure to the sulfur gases of the atmosphere.

The oxid is used in medicine mainly as a mild astringent application to inflamed surfaces, either in the form of dry powder or mixed with some fatty ointment base, as benzoated lard. In dentistry it is made into a paste either with glacial phosphoric acid or solution of zinc chlorid and used, under the name of oxyphosphate or oxychlorid of zinc, as a cement for filling carious teeth.

Zinc Hydroxid, $Zn(OH)_2$, is thrown down when a soluble salt of zinc is treated with a caustic alkali. If an excess of the reagent is added the hydroxid dissolves to form a soluble alkaline zincate.



Halogen Compounds.—Zinc chlorid is usually seen in the form of a colorless solution or in the form of white cylindrical sticks, and is used as a caustic in surgery and as a reagent. It may be obtained either by dissolving zinc, its oxid or carbonate in hydrochloric acid. The solid is very deliquescent, rapidly liquefying in the air through absorption of moisture.

The bromid and iodid resemble the chlorid in their properties, and are used to some extent in medicine.

Zinc Sulfate, or white vitriol, $ZnSO_4 \cdot 7H_2O$, is formed when the metal or its oxid or carbonate is dissolved in dilute sulfuric acid. It crystallizes with seven molecules of water in the form of colorless rhombic crystals, isomorphous with magnesium sulfate, for which it is sometimes mistaken. It is an efficient emetic in doses of 0.3 to 1 Gm.

Zinc Carbonate, $ZnCO_3$, occurs naturally as the mineral calamine. When produced by precipitating a solution of a zinc salt with an alkaline carbonate, a basic salt of varying composition is thrown down, the exact composition depending upon the concentration of the solutions and their temperature.

Characteristic Reactions.—When solutions of zinc salts are treated with caustic alkalis a white precipitate of the hydroxid, $Zn(OH)_2$, is thrown down, soluble in an excess of either fixed or volatile alkalis. Its solubility in the fixed alkalis distinguishes zinc from the other members of the family, and its solubility in ammonia from aluminum.

Alkaline sulfids, or hydrogen sulfid in alkaline mixtures, precipitate the white sulfid, ZnS , soluble in dilute acids, except acetic. Zinc sulfid is the only white sulfid formed in the wet way.

Another very characteristic reaction is the white precipitate of zinc ferrocyanid formed when potassium ferrocyanid is added to a neutral zinc salt, most ferrocyanids being deeply colored.

A solid zinc compound heated on charcoal with sodium carbonate before the blow-pipe yields metallic globules surrounded by an incrustation of oxid, yellow while hot, white when cold. The incrustation if moistened with cobaltous nitrate and again heated forms a green mass known as Rinman's green.

CADMIUM.

Symbol Cd. Valence 2. Atomic Weight 111.5. Specific Gravity 8.65.

Historical.—Obtained in 1817 by Stromeyer from the white sublimat found in a zinc furnace. The name is derived from *kadmia*, the Greek for the mineral calamine, in which cadmium is often found.

Natural Occurrence.—Cadmium compounds occur in small quantities in zinc ores, and as the natural sulfid in the form of glittering yellow crystals known as greenockite. It is a comparatively rare metal.

Preparation.—When zinc ores containing cadmium are smelted the more volatile cadmium oxid passes off first, mixed with zinc oxid. The mixed oxids are then reduced with charcoal, as in the case of zinc. The reduced metal is redistilled, and further purified by dissolving in hydrochloric acid and reprecipitating upon plates of zinc.

Description and Physical Properties.—Cadmium is a lustrous, tin-white metal, and takes a high polish. It is both malleable and ductile, and can be rolled into thin foil or drawn into fine wire. When bent it emits a crackling sound like tin and zinc, and breaks with a fibrous fracture. It can be cut with a knife, but is harder than tin. It melts at $320^\circ C.$, and vaporizes at $760^\circ C.$, yielding a dark yellow vapor of a disagreeable odor. It has been used in dentistry to some extent as a constituent of amalgams.

Chemical Properties.—When heated in air it burns with a bright light, forming the brown cadmium oxid, CdO . The metal is generally soluble in dilute mineral acids.

PRACTICAL STUDIES.

1. To solution of zinc sulfate add potassium or sodium hydroxid very gradually. Represent the reaction by an equation.

2. To the last mixture add more of the alkali, and note whether solution is effected. What metals are distinguished from zinc by this reaction?

3. Repeat experiments 1 and 2, substituting ammonia water for the fixed alkali.

Balance the equations:



4. To zinc sulfate solution add solution of ammonium sulfid. What is produced? Write the equation.

5. To zinc sulfate solution add potassium ferrocyanid solution. What occurs? Balance the equation—



6. Mix any solid zinc compound with dry sodium carbonate and heat on charcoal before the blow-pipe. Note whether metallic globules are produced, and also whether a coating is deposited upon the charcoal.

7. Place some solid zinc compound, oxid or carbonate, on charcoal and after heating with the blow-pipe, moisten with cobaltous nitrate and heat again. What is produced?

It is possible that the general public may in time become interested in the specifications of makes or brands upon physicians' prescriptions. A retail druggist who is an extensive advertiser announces that he keeps a full line of —'s pharmaceuticals and advises his customers that they are assured of getting the proper article if prescriptions specifying any of the firm's goods are brought to him.

LECTURE No. 60.

Pharmaceutical Microscopy.

Preparation, Staining and Mounting Sections.

SECTIONING OF SOFT TISSUES.

The object of sectioning is to obtain the tissue in a piece thin enough to permit the passage of sufficient light through it to form an accurate image in the microscope.

Free Hand Cutting.—The simplest manner of making sections is by the free hand method. For this there is required either a razor, or a section knife of razor-like keenness. Supposing the object to possess sufficient firmness to permit sectioning in this manner, it is held between the thumb and finger of the left hand, the back of the razor rested on the knuckle of the finger and drawn slantingly across the object, so as to cut as thin a section as possible from its top, the thumb knuckle being depressed to prevent cutting it. Usually both hands are held against the body to insure steadiness. The object and knife are wet with water to facilitate cutting and the removal of the sections afterward. A number of sections having been cut they are washed off into a watch glass or removed with a camel's-hair pencil, and the thinnest and most perfect ones selected for examination.

If the object is not firm enough to stand up under the pressure of the knife, it may sometimes be sectioned by enclosing it between two pieces of supporting material, as pieces of carrot or elder pith, and making a section through the object and the supporting material.

Cutting With the Simple Microtome.—The simple microtome is best understood from the illustration (Fig. 35). It consists of an object holder, in which the body to be sectioned is placed, and a fine threaded screw at the bottom by means of which it can be elevated so as to regulate the thickness of the sections cut off. The broad top serves as a support and guide for the knife, which should be ground flat on the under side.

The head of the screw is graduated so that the elevation of the object for each turn of the screw is given, and the thickness of the section is consequently known. Numerous other patterns of simple and hand microtomes

are made and used, almost any of them answering the purpose of the student of pharmacy.

Cutting with the Mechanical Microtome.—The mechanical microtome includes both a holder for the article to be sectioned and a carriage to which the knife is attached,

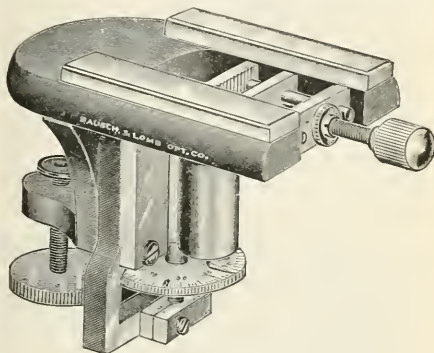


Fig. 35.—Simple Microtome.

which runs on guides so as to insure the cutting of sections of equal thickness throughout. (Fig. 36.) The mechanism by means of which the thickness of the sections is regulated is also usually more perfect than in the hand microtome.

One of the simplest forms, known as the Student Microtome, manufactured by Bausch & Lomb, is figured in the cut, the illustration showing the method of attaching the knife, the object holder or clamp, the feed mechanism, and the pan for collecting the drip from the knife.

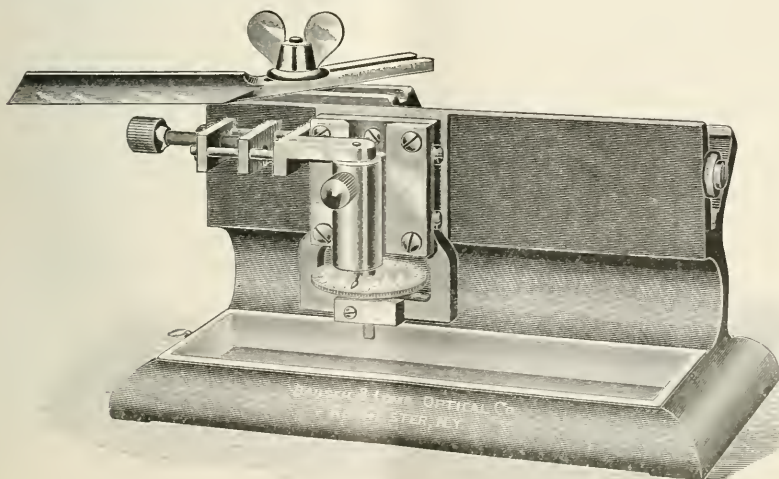


Fig. 36.—Bausch & Lomb Student Microtome.

Keeping the knife blade moistened either with water or with diluted alcohol facilitates the removal of the sections after they are cut.

Hardening Soft Tissues For Cutting.—Very many substances, especially animal tissues, are of such a soft consistence as to break down under the pressure of the knife in the attempt to cut them. Such objects before they can be sectioned must be subjected to a preparatory treatment, which may consist either of *hardening* or of *imbedding*.

Of the many hardening fluids which have been proposed, alcohol has generally proved the most useful. If a soft specimen, a piece of liver, for example, be placed in strong alcohol for a day or so it will generally prove firm enough to permit sectioning by one of the methods previously mentioned. The hardening effect of the alcohol is due partly to its affinity for water, which it abstracts from the tissue, and partly to its coagulating effect upon the albuminous constituents.

In order to secure the most satisfactory results, the following precautions should be observed:

The object should be small, not more than 1 x 0.5 c.M. in size, and should be macerated in twenty-five to thirty times its volume of the alcohol.

The best results will be obtained by macerating an hour or more in alcohol not stronger than forty per cent., transferring to fifty per cent. for several hours, then to sixty or seventy, and finally to ninety-five per cent. alcohol for twenty-four hours or longer. By thus gradually increasing the strength of the alcohol, and the time of maceration in each, the specimen will be hardened more thoroughly and evenly and without the shrinking which occurs when strong alcohol is used at the start.

Imbedding of Soft Tissues.—When the preceding process does not yield a specimen of sufficient firmness for sectioning, a process of imbedding must be added. This consists in saturating the specimen with some substance in the liquid condition which upon hardening braces and supports the delicate cells of the tissue so that the microtome knife will cut instead of tearing them.

Of the substances most used for imbedding purposes only two need to be mentioned, paraffin and celloidin, and of these only the first need be described.

As paraffin will not penetrate a tissue containing water, the first step in preparing the specimen for imbedding in this material is that of *dehydration*. This is accomplished exactly as the hardening process just described, by macerating the specimen in alcohols of successively increasing strengths, up to absolute alcohol.

The next step is getting rid of the alcohol used for dehydration. This is accomplished by maceration in chloroform or turpentine for twenty-four hours, the first substance being preferable. The specimen is now prepared for the paraffin bath by another maceration of twenty-four hours in chloroform which has been saturated with hard paraffin. After this preliminary saturation, or *infiltration*, it is transferred to pure hard paraffin melted on a water bath, and kept just above its melting point for a period of from two to six hours, at the end of which time the specimen will be ready for the last process, or *casting*.

For this purpose a small circle of melted paraffin is made upon smooth, hard paper, and the specimen placed upon it. Over this is placed a mold, consisting of a small ferule or brass collar, or the molding box of the illustration, (Fig. 37), and the mold filled to the surface with the melted paraffin.

After cooling, the lump of paraffin is slipped out of the mold, and cut down with a knife until the specimen is

nearly reached, and until of proper size to be held in the jaws of the microtome, or it may be fastened to a small block of cork, by melting the paraffin on the bottom, and the block fastened in the microtome. The knife in cutting should be kept moistened with alcohol or turpentine.

The subsequent treatment of the sections will be considered under staining.

Freezing Soft Tissues.—Another method of preparing soft tissues for sectioning is by freezing. This is performed by macerating the small piece of tissue in mucilage of acacia until thoroughly infiltrated with that liquid. It is then transferred to a holder consisting of a thin metal plate, against the under side of which is sprayed a thin stream of ether, liquid carbon dioxide, or other volatile liquid, which in evaporating absorbs so much heat from the specimen as to freeze it solid, mucilage being added until it is completely covered. The frozen mass is then placed in the microtome, and sections made in the usual manner.

While the process requires special apparatus, it affords the advantage that only a simple washing in water is necessary to fit the sections for the subsequent staining processes.

STAINING PROCESSES.

Principles of Staining.—As explained in the last lecture, where all the constituent parts of a tissue have a similar effect upon light it is necessary to make use of stains to cause the different elements to become visible. This is possible because of the fact that the different kinds of cells in a tissue usually have different degrees of affinity for coloring matters, some of them being saturated easily while others may refuse to take up any of the stain.

It is a cardinal principle of staining that the section should be moistened with the same character of liquid as the solvent in which the stain is dissolved, or with a liquid miscible with the latter, and which is also a solvent for the staining substance.

It is also a rule that if the section is saturated with an imbedding material, it must be entirely deprived of the latter before being added to the stain. In a few cases where celloidin is the imbedding substance it need not be removed before staining.

If the object has been sectioned without imbedding, it is only necessary to immerse the section a few minutes in alcohol of the same strength as the stain, provided the latter is made with alcohol, and then immerse in the stain until sufficiently colored. The section is then removed, washed free from superfluous stain, and mounted for examination in water or glycerin and water. If intended to be mounted in balsam as a permanent mount, it must be deprived of water by the treatment subsequently described.

The tendency with beginners is generally to overstain rather than understain. When this occurs the excess of color is removed by immersion for a few minutes in alcohol acidulated with hydrochloric acid, afterwards washing out the acid.

For the manipulation of sections during the operations of staining, etc., small spatula-like instruments are employed, known as *section lifters*. In most cases a camel's hair pencil will serve equally as well and in some cases better.

Staining Imbedded Sections.—If the section has been imbedded in paraffin this substance must be dissolved out before the tissue will take the stain. As the removal of the paraffin and subsequent manipulation involve considerable handling of the thin sections, it is recommended that the process suggested by Dr. William M. Gray, and developed by the late Dr. J. E. Reeves, be followed.

This method consists in fixing the section containing the paraffin directly to the center of a glass slip in the position which it is to occupy in the finished mount. The



Fig. 37.—Moulding Box for Paraffin Casts.

slip containing the section is now stood on end in a wide-mouthed bottle containing chloroform, benzol, or turpentine, to dissolve out the paraffin. After this treatment the slip is immersed in alcohol until the last used solvent is removed, and is then ready for the staining.

This may be accomplished either by dropping the stain directly upon the section on the slide, or by immersing slide and all in a wide mouth bottle containing the stain, afterwards washing out the excess, and if necessary, decolorizing with alcohol acidified with hydrochloric acid.

As a fixative for fastening the section to the slip, beat up the white of one egg in 250 Cc. of a ten per cent. solution of carbohc acid, and strain through muslin.

Mounting in Balsam.—Before a section can be mounted successfully in balsam it must be entirely deprived of water and all substances which do not readily mix with the balsam, and be made transparent, or it must be subjected to the processes of dehydration and clearing.

The dehydration is accomplished, as previously described, by immersing the section, or the slip bearing it, in nearly or quite absolute alcohol for an hour or more. To clear it, it is then transferred to either xylol, benzol, or turpentine, preferably the first, and kept there until it appears perfectly transparent. Removing from the last liquid, the slide is wiped dry, a drop of balsam dissolved in xylol placed on the section, a cover-glass pressed down upon it, and the slide set aside to dry and harden.

Stains.—The number of stains which may be employed in microscopy, especially in bacteriological work, is legion. The beginner is advised to purchase his stains already prepared, and to use only one or two, as Grenacher's Borax Carmine, and Klein-berg's Hematoxylin, until he has had sufficient experience to enable him to judge what stains will work best in a given case. The two most useful anilin stains for student's use are fuchsin and methylene blue, dissolved in alcohol.

SECTIONING OF HARD TISSUES.

The harder vegetable tissues may usually be rendered soft enough for sectioning by heating for a shorter or longer time in boiling water. The harder tissues of animals, as bones and teeth, may be sectioned either by decalcification and cutting on the microtome, or by grinding a thin slice down to the degree of transparency.

Decalcification.—Decalcification consists in depriving a tooth or bone of its inorganic constituents (mainly calcium carbonate and phosphate) by maceration in dilute acids. The animal structure left is translucent, and soft enough to be cut with a knife.

The strength of acid most suitable for decalcification is hydrochloric acid five to ten per cent., chromic one-half to one per cent., and nitric one per cent.

The specimen, say a tooth or piece of bone, is immersed in fifteen to twenty times its volume of the acid, which is to be changed every twelve hours, if necessary, until it becomes translucent and is soft enough to be punctured with a pin. It is then transferred to a strong solution of sodium bicarbonate for six to twelve hours, to neutralize the acid, thoroughly washed in water, and is then ready for sectioning in the usual manner.

The sections may then be stained, dehydrated in absolute alcohol, cleared in xylol or benzol, and mounted in xylol balsam.

Sections of Hard Tissues by Grinding.—The objection to decalcification is that the acids not only remove part of the tissue structure, but cause material changes in the portions which remain. The grinding process, while

much more tedious, at least gives sections which exhibit the structure in its natural condition.

In preparing a section by this method, the first step is to cut, with a saw, as thin a slice, longitudinal or transverse, as may be done with safety. Instead of sawing, the slice may be made by filing, but requires more work.

The slice so made is held with the finger tips against an emery wheel, or rubbed on a fine grained file, until one side is tolerably smooth, the finish being given by rubbing on a fine hone, and lastly on a leather strop or similar piece of leather.

A large drop of balsam is then placed on the middle of a piece of glass of convenient size for holding, and heated until volatile portions are driven off and the balsam hardens on cooling. Warming the balsam again until it softens, the specimen is pressed upon it, with the smooth side next the glass, and allowed to cool. The object of the glass is to prevent the section from breaking when the required thinness is reached, and to serve as a handle by means of which it can be held while the other side is being ground and polished like the first. When sufficiently thin to be transparent, the glass is stood on its edge in a vessel of benzol until the balsam is dissolved, and the section drops off by its weight. Any attempt to force it loose from the glass will almost certainly re-

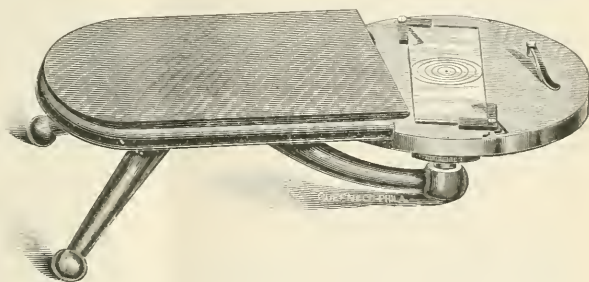


Fig. 38.—Queen & Co.'s Self-Centering Turn Table.

sult in breaking. It may be washed in strong alcohol, using a camel's-hair brush, and set aside until the surface dries off.

While the section is drying, a drop of balsam is placed on the center of a slip and heated until it will harden at once on cooling. Another drop is placed on a cover-glass and treated similarly. The section is now placed in the center of the balsam, covered with the cover-glass, and the slip heated until the balsam softens.

The object of the preliminary heating of the balsam is to drive off the liquid portions which would otherwise gradually penetrate the section, and render it so transparent as to render its structure indistinguishable.

Finishing Slides.—The glass slip containing a specimen suitably mounted, and covered with a cover-glass is technically known as a slide. The finishing consists in the addition of a label to one or both ends of the slip, upon which the name of the specimen and other data are marked, and frequently the application of one or more rings of paint or cement connecting the margin of the cover-glass with the slip. This ring is in some cases intended as a protection, and in others added merely as an ornament, and is applied by means of an instrument known as a turn table. (Fig. 38.)

The slide having been placed on the turn table, and properly centered, the table is set whirling with the finger of one hand, while with the other hand a camel's-hair pencil charged with cement, Brunswick black, or other pigment, is held in such a manner as to leave a smooth and uniform circle around the edge of the cover-glass. Several layers of cement are usually added, leaving an interval for drying after each application.

NEW UNOFFICIAL FORMULAS.*

ELIXIR SALOLIS.

Elixir of Salol.

Salol	40 grams
Glycerin	136½ grams
Oil of curacao orange	4 Cc.
Oil of lemon	3 Cc.
Compound tincture of eudbear	4 Cc.
Alcohol (95%) a sufficient quantity to make	1000 Cc.

Dissolve the salol and the oils in 450 Cc. of alcohol. Add 125 Cc. of alcohol and the compound tincture of eudbear to the glycerin and mix this with the solution of salol. Finally add enough alcohol to make 1000 Cc.

NOTE.—It is preferable to use absolute alcohol and dilute it to 95 per cent. Each fluid dram contains about 2½ grains of salol in clear solution.

EXTRACTUM SENNAE FLUIDUM AROMATICUM.

Aromatic Fluid Extract of Senna. (Fluid Senna.)	
Senna, in No. 40 powder	1000 grams
Sugar	500 grams
Oil of coriander	0.75 Cc.
Diluted alcohol, a sufficient quantity to make	1000 Cc.

Percolate the senna as in Formula 174, National Formulary. Then take out the senna, dry it and prepare a fluid extract by process A and diluted alcohol. Dissolve 550 grams of sugar in the reserved percolate by heat over water bath and evaporate to about 700 Cc. Dissolve the remainder of the sugar in the exhaust percolate and evaporate on water bath until this, when mixed with the reserved portion and strained, will measure 1000 Cc. Lastly add the oil of coriander and mix thoroughly.

NOTE.—This preparation contains very little or no alcohol. It contains the strength of the fluid extract with the properties of the syrup and is therefore especially adapted for children.

Dose: One to four teaspoonfuls.

LINIMENTUM STILLINGIAE

Liniment of Stillingia.

Oil of stillingia	25.5 Cc.
Oil of lobelia	7 Cc.
Oil of cajuput	13.5 Cc.
Alcohol, a sufficient quantity to make	100 Cc.

Mix.

LIQUOR ANTISEPTICUS.

Antiseptic Solution.

Boric acid	13 grams
Sodium bicarbonate	8.5 grams
Benzoic acid	17 grams
Thymol	3 grams
Menthol	2 grams
Oil of gaultheria, 42 drops, or	1.34 gram
Oil of eucalyptus, 21 drops, or	.66 grams
Tincture of baptisia, 450 drops, or	9 Cc.
Alcohol	400 Cc.
Distilled water a sufficient quantity to make	1000 Cc.

Dissolve the sodium bicarbonate and the boric acid in 200 Cc. of water. Dissolve the remaining ingredients in the alcohol. Add the first solution to the second and then add sufficient distilled water to make 1000 Cc. Filter if necessary.

An excellent antiseptic for local applications and wound dressing. Also used internally in one-half to one teaspoonful dose well diluted with water.

LIQUOR FERRI ALBUMINATIS.

Solution of Albuminate of Iron.

Ferric chloride	10 grams
Fresh egg albumin	37.5 Cc.
Glycerin	250 Cc.
Distilled water, a sufficient quantity to make	1000 Cc.

Dissolve the ferric chloride in 125 Cc. of water. Mix the egg albumen with 250 Cc. of water. Add the solution of iron to the mixture of egg albumen and allow

to stand 12 hours. Add the glycerin, mix and filter, adding sufficient water through the filter to make 1000 Cc. Keep the product in well filled bottles and in a cool place.

A clear solution of almost neutral chloride of iron with egg albumen in combination without turbidity.

Each fluid dram contains 4½ grains of crystallized ferric chloride which is equivalent to about 40 drops of tincture of ferric chloride.

LIQUOR FERRI ET MANGANI PEPTONATIS

Solution of Peptonate of Iron and Manganese.

Manganese peptonate	100 grams
Iron peptonate	150 grams
Glycerin	50 Cc.
Spirit of cinnamon	20 Cc.
Aromatic spirit	50 Cc.
Distilled water a sufficient quantity to make	1000 Cc.

Dissolve the salts in the glycerin and 650 centimeters of water. Add the aromatic spirit and sufficient water to make 1000 Cc. Filter. This solution represents about one-third of one per cent. of manganese and ½ per cent. of peptonate of iron. Each fluid dram contains about 6 grains of peptonate of manganese and 9 grains of peptonate of iron.

PULVIS ACETANILIO AMMONIATIS.

Ammoniated Powder of Acetanilid.

Acetanilid	25 grams
Ammonium carbonate	10 grams
Sodium bicarbonate	5 grams
Sugar of milk	60 grams

Triturate the ammonium carbonate and acetanilid intimately together. Add the sodium bicarbonate and sugar of milk and mix thoroughly.

NOTE.—Each 10 grains represents 2½ grains of acetanilid, 1 grain of ammonium carbonate and ½ grain of sodium bicarbonate.

The powder is readily soluble in water and should be kept in well stoppered bottles.

This preparation has no depressing effects like acetanilid alone, but, on the contrary, stimulates the heart and circulatory system. It is an invaluable remedy in dysmenorrhoea and in dyspeptic disorders, for the relief and permanent cure of gastralgia, hyperacidity of the stomach and atonic dyspepsia.

SODII PHOSPHAS LIQUEFACTUS.

Liquefied Sodium Phosphate.

Sodium phosphate	100 grams
Citric acid	23.4 grams

Triturate together and heat on a water bath until liquefied. Strain through a paper of cotton if necessary.

NOTE.—Each fluid dram of this liquid represents 75 grains (4.86 grams) of sodium phosphate.

This preparation will crystallize at 15° C. (59° F.), but will readily liquify again upon warming. It is miscible with water or syrup in all proportions without separation.

Cathartic and antacid. Stimulant of biliary secretion. Useful as mild laxative and in calculi of bladder. Dose.—½ to 1 teaspoonful.

SYRUPUS BROMIDORUM.

Syrup of the Bromides.

Potassium bromide	80 grams
Sodium bromide	80 grams
Ammonium bromide	48 grams
Calcium bromide	24 grams
Lithium bromide	8 grams
Compound tincture of benzoin	30 Cc.
Sugar	600 grams
Tincture of vanilla	60 Cc.
Water, a sufficient quantity to make	1000 Cc.

Dissolve the bromides in 450 Cc. of water. Dissolve the sugar in this solution, add the tinctures and strain.

NOTE.—Each fluid dram contains about 15 grains (1 gram) of the combined bromides.

Sedative, alterative, useful in epilepsy.

*From the Physicians' Edition of the Cincinnati Academy of Pharmacy Formulary.

SYRUPUS FERRI ALBUMINATIS.

Syrup of Albuminate of Iron.

Ferric chloride	10 grams
Fresh egg albumen	315 Cc.
Sugar	150 grams
Distilled water, a sufficient quantity to make	1000 Cc.

Dissolve the ferric chloride in 60 Cc. of water. Add this solution to the egg albumen previously mixed with 200 Cc. of water. Percolate this solution through the sugar and add sufficient water through the percolator to make 1000 Cc.

Dose.—1 teaspoonful.

SYRUPUS QUININE PHOSPHORHYDROCHLORATIS COMPOSITUS.

Compound Syrup of Phospho Muriate of Quinine.	
Potassium bicarbonate	35 grams
Magnesium carbonate	20 grams
Calcium carbonate	20 grams
Soluble ferric phosphate	16 grams
Quinine hydrochlorate	4 grams
Strychnine	0.14 grams
Phosphoric acid (U. S. P. 85 per cent.) ..	40 Cc.
Orange flower water	125 Cc.
Syrupus, a sufficient quantity to make	1000 Cc.

Dissolve the salts in a mixture of the phosphoric acid and the orange flower water. Add sufficient syrup to make 1,000 Cc. Each fluid dram of this preparation contains $\frac{1}{4}$ grain of muriate of quinine, 1-120 grain of strychnine, 1 grain of phosphate of iron and about 4 grains of the combined phosphates of potassium, magnesium and calcium.

This preparation is to be freshly prepared when wanted for use. An admirable tonic for the nervous system and digestive organs.

SYRUPUS TRIFOLII COMPOSITUS.

Compound Syrup of Trifolium.

Fluid extract of trifolium	80 Cc.
Fluid extract of lupuli	40 Cc.
Fluid extract of berberis aquifolium ..	40 Cc.
Fluid extract of cascara amara	40 Cc.
Fluid extract of phytolacca	40 Cc.
Fluid extract of xanthoxylum	10 Cc.
Sugar	650 grams
Potassium iodide	20 grams
Distilled water, a sufficient quantity to make	1000 Cc.

Mix the fluid extracts with sufficient water to make the whole measure six hundred (600) cubic centimeters. Allow to stand one hour, filter and percolate the sugar with the filtrate. Dissolve the iodide of potassium in the syrup and add sufficient water to make 1,000 Cc.

Powerfully alterative.

THYMOL IODIDUM.

Thymol Iodide.

Thymol	50 grams
Potassium iodide	58 grams
Sodium hydrate	50 grams
Water, a sufficient quantity to make	500 Cc.
Solution of chlorinated soda, a sufficient quantity, about	3000 Cc.

Dissolve the solid ingredients in the water and gradually add to the solution of chlorinated soda. Collect precipitate on filter and wash with water until free from chlorides. Remove precipitate and dry carefully at temperature not exceeding 27° C. Reduce to powder and keep in well stoppered dark bottle.

Note.—This powder contains 45 per cent. of iodine and has the formula of $C_{10}H_7O_2I_2$. Germicide and antiseptic. Used externally.

TINCTURA VIBURNI OPULI COMPOSITA

Compound Tincture of Viburnum Opulus. (Viburnum Compound.)

Fluid extract viburnum opulus	150 Cc.
Fluid extract scutellaria	50 Cc.
Fluid extract of dioscorea	50 Cc.
Fluid extract of trifolium	50 Cc.
Fluid extract of aleris	50 Cc.
Tincture of cinnamon, a sufficient quantity to make	1000 Cc.

Mix and allow to stand a few days and filter. Each fluid dram represents 10 minims of fluid extract of

cramp bark, and 3 minims each of sculleap, wild yam, both root and star grass.

For all internal pains, spasms, hysteria.

VINUM HYPOPHOSPHITUM COMPOSITUM.

Compound Wine of Hypophosphites.

Calcium hypophosphite	17.5 grams
Potassium hypophosphite	8.75 grams
Sodium hypophosphite	8.75 grams
Ferric hypophosphite	1.125 gram
Manganese hypophosphite	1.125 gram
Quinine hydrochlorate	0.500 gram
Potassium citrate	2.5 grams
Citric acid	1 gram
Strychnine	0.175 gram
Fluid extract erythroxylum	88 Cc.
Sugar	350 grams
Glycerin	37 Cc.
Alcohol	10 Cc.
Water	250 Cc.
Stronger white wine, a sufficient quantity to make	1000 Cc.

Mix the fluid extract with the glycerin and add 400 Cc. of stronger white wine. Allow to stand twenty-four hours and filter. Triturate the hypophosphites of iron and manganese with the potassium citrate, citric acid and 30 Cc. of water and warm mixture for a few minutes until dissolved.

Dissolve the other hypophosphites, quinine hydrochlorate in 220 Cc. of water, to which add the strychnine previously dissolved in the alcohol. Add the second solution to the third and filter. Dissolve the sugar in the filtrate by percolation, adding sufficient water through the percolator to make 500 Cc. Lastly add to this syrup the mixture of fluid extract and sufficient stronger white wine to make 1,000 Cc.

Each fluid dram represents 1 grain hypophosphite of calcium, $\frac{1}{2}$ grain each of hypophosphite of potassium and sodium, 1-16 grain each of hypophosphite of iron and manganese, 1-32 grain hydrochlorate of quinine and 1-100 grain of strychnine and 5 grains of coca.

KINO.*

"The official variety of kino is now almost unobtainable. Can its place be effectively supplied by others met with in commerce?"—Question No. 49, in the B. P. C. Blue List."

According to Pereira, Dr. Fothergill, in 1757, described, under the name "gummi rubrum astringens gambiense," an astringent gum supposed to have come from the Gambia. In 1774 it was introduced into the Edinburgh Pharmacopoeia as "gummi kino," and in 1787 into the London Pharmacopoeia as "resina kino." and was, moreover, so described in the third edition of "Lewis's Exp. Hist. of the Mat. Med.," by Dr. Aitken, in 1784.

The source of supply then has since been identified as the *Pterocarpus erinaceus*, of Poir., a West African tree which attains a height of 40 to 50 feet and is known in the Mandingo language as "kano." The juice, known by the Portuguese as "dragon's blood," exudes naturally from cracks in the bark, and soon hardens in remarkably brittle blood-red tears, which in chemical characters and solubility are almost identical with the gum of *Pt. marsupium*, Roxb.

An inferior gum of somewhat similar properties, known variously as bengul, palas, pulas, or butea kino, and derived from the *Butea frondosa* and allied species, and for which there is still a large sale, was long confounded by European druggists with genuine kino. Only quite recently, indeed, some thousand pounds were purchased by the traveler of a large firm, presumably for manufacture into a genuine and thoroughly reliable article. Real gum could have been obtained nearly as easily and almost as cheaply.

*An article contributed to the *Chemist and Druggist* (Eng.) by a gentleman who has had much experience in the collection and preparation of kino in Madras, but who prefers that his name should not appear.—Ed. C. and D.

Of late years a considerable and growing trade has been done in the various eucalyptus gums (especially that of *Eucalyptus resinifera*), known as Australian, Eucalyptus, or Botany Bay kinos. The best varieties agree closely in appearance and behavior with true kino. The substance is mostly collected by the sawyers and wood-splitters, being found in cavities within the trunks of trees of all sizes. It is at first a viscid liquid, but dries into reddish-brown masses or grains, thin fragments of which appear amorphous and of a garnet-red hue. The best grades are from *Eucalyptus rostrata*, *E. citrifolia*, and *E. corymbosa*.

Pterocarpus marsupium (Koxh. "Fl. Br. Ind., ii., 237), the Indian or true kino tree, is a large deciduous tree, extending from Ceylon through Southern and Western India, to as far North as Banda in the Northwestern Provinces, and the Rajmabli Hills in Behur—i. e., to about 20° North. It grows to the greatest perfection over the Western Ghats, throughout Travancore, Malabar, South Canara, and parts of Coimbatore. It furnishes a most perfect and invaluable timber, suitable for any in or outdoor work, it being unaffected by sun or wet; while, owing to the large amount of essential oil it contains, white ants and other insects give it a wide berth. The fracture, which is good, exhibits a wiry splinter, and the wood is eminently well suited for ordnance purposes. The sapwood is small, and the heartwood, which takes a fine polish, is brown, hard, and durable.

The leaves form an excellent fodder, which is in great demand. Little or nothing seems to be known about the essential oil above referred to. The juice, of gum kino, is obtained by making a perpendicular incision, with lateral ones leading into it, in the trunk of the tree, at the foot of which is placed a vessel to receive the juice.

In Canara, little cups made of leaves are used, and the gum there collected assumes the shape of concavo-convex cakes, 3 to 4 inches in diameter, which are broken up and garbled by the dealers.

The main supply, however, is from the Government forests in Wynad (North Malabar). At the foot of the Ghats lies Anjurakandy, the factory at which the first supply is supposed to have been prepared for the market, early in this century, from juice brought down from the country above the Ghaut.

At page 218 of the British Pharmacopoeia the juice is directed to be "inspissated without artificial heat," and at page 330 of Squire's "Companion" the same instructions are given. The reasons appear to be the fear that artificial heat might cause a deterioration in the astringency of the drug, and also, perhaps, damage the color.

In Fliickiger and Hanbury's "Pharmacographia," p. 195, and at page 358, Part I., vol. vi., of Watt's "Dictionary of the Economic Products of India," and in other works, it is stated that the gum soon hardens on exposure to air. For some reason which is still unexplained it appears that of late years the gum has been boiled in the forest, and has arrived in the low country in a semi-fluid state, looking somewhat like badly-made and partly-set red-currant jelly. It takes in this condition a very considerable time to harden, and loses, roughly, one-third of its weight in the process—e. g., 700 pounds exposed during the fervent heat of May in bowls and dishes had not completely dried until the end of August, the yield then being 487 pounds.

When dry, Malabar kino consists of dark, blackish-red, brittle, angular fragments, rarely larger than a pea, and easily splitting into still smaller pieces, which are amorphous under the microscope, translucent, and of a bright garnet hue. They sink in cold water, in which by agitation they are partly soluble, the solution having an astringent taste, and throwing down a pale, floccy deposit, which is dissolved by heat, only to be again thrown down in more voluminous forms on cooling.

In the "Pharmacographia Indica" (vol. i., p. 464) it is

stated that neither Hindu nor Mahomedan medical writers appear to notice Malabar kino.

Rumphius calls the tree *Pterocarpus indicus*, and states that the gum, which looks like dried blood, cures diarrhoea, and that the leaves are applied to boils, etc.

Ainslie, in his "Materia Medica" (ed. 1826, p. 185) states that the drug is but slightly known in India.

Bearing in mind that, as stated above, the African name for *Pt. erinaceus* is "kano," it is curious that the Persian name for the drug should be "Khunâ," while in the Central Provinces one of the names for butea gum is "kinta."

In addition to its medicinal virtues, on which it would be superfluous to dilate here, the gum is said to have been used in the manufacture of certain wines (which is the purpose for which most of the kino now imported is employed). It should also prove of value in tanning and dyeing. The bark yields a brownish-red coloring matter, which produces delicate reddish fawns with tussur silk, and the so-called "Nankin" with cottons.

In the C. & D. market report for the week ending October 28, 1897, an entry is made regarding some "fine Cochin grain" kino that was offered. This most probably was a portion of the 700 pounds referred to above, and which was never anywhere near Cochin.

It is this want of local knowledge that perhaps explains the dearth of true kino in the London market, and which is otherwise somewhat difficult to understand. The ports of outlet for the various tracts would be Cochin and Alleppey for the native State of Travancore; Calicut and Tellicherry for Malabar, in which would be included the main sources of supply, namely, the Nelliampathy Hills, the Nilambur Forests below and on the Ghats, and the extensive reserves in Wynad. The produce of Coimbatore would also find its way to Calicut, as being the nearest port, while gum collected in South Canara would be shipped at Mangalore, but means of communication in that district are backward, and the roads are indifferent.

In some of the Government forests (notably those of Coimbatore) the gum has never even been collected. In others the tapping, etc., is done by the rangers under the supervision of the district forest officers, while in yet others the right to tap the trees, subject to the condition of its being done properly and without causing undue damage, may be easily obtained. The right is put up to auction, together with that of collecting other "minor forest produce," such as beeswax, etc. The cost of collection cannot be heavy, for two or three years ago the Government medical stores at Bombay were supplied by the district forest officer of North Malabar at 8s. per pound, and about the same time he was glad to sell a second supply at 1s. per pound, so that it seems his difficulty was to find a market.

It would appear, therefore, that were inquiries made in the right direction, there should not be much difficulty in obtaining a fair supply for the drug market, while, on a large demand being created by an increased use of the gum in the arts, many a coffee planter would be glad to grow *Pt. marsupium* as a shade tree in place of some of the less profitable timber now left standing.

CARBOLIC ACID POISONING FROM ABSORPTION THROUGH THE SKIN.—Some time ago R. C. Lucas observed two cases of poisoning that were due to application of surgical dressings containing carbolic acid, and has ever since used only a 2 per cent. solution of lysol, without ever noticing deleterious effects from it. Recently a compress saturated with a 5 per cent. carbolic acid solution was placed on the foot and thigh of a girl 5 years old, through an error, and within 3 hours strong symptoms of poisoning manifested themselves, which were gradually allayed by suitable treatment. (Ap. Ztg.)

AN ATTEMPT TO DEFEAT THE OBJECT OF THE PATENT LAW.*

By F. E. STEWART, M. D.,
of East Orange, N. J.

Of late years there has come into vogue what is known as the proprietary system, by which the trade-mark law is perverted to defeat the object of the patent law. It is the very antithesis of the patent system in that its object is to conceal knowledge for trade purposes and protect unlimited monopolies. The system rests upon what seems to be a false definition of the trade mark. A trade mark consists of a mark, sign, emblem, or word employed as a commercial signature or brand mark, to distinguish between two or more brands of the same article on the market. But the manufacturers of secret and semi-secret articles claim that the only name by which a thing is known may be employed as a trade mark and perpetual monopoly established in the use of such name as applied to the article for which protection is desired. As a trade mark does not expire like a patent, being protected by the common law, the patent thus secured of the name of a secret composition permits the manufacturer to continue to protect a monopoly in the article itself for an unlimited time.

This system of protection is more stringent than that given by the patent law, and as no invention is required other than the invention of the name, and as no publication is demanded, a more valuable reward is secured by merchants in unpatented and unpatentable articles than the patent law gives to inventors of new and useful inventions. Thus the trade-mark law is ingeniously perverted and a system of unfair monopoly in trade is engendered, which is not only injurious to commerce, but hinders progress in science and in the useful arts. Moreover, when applied to medicine the proprietary system permits the ignorant tradesman to enter into competition with educated physicians and pharmacists in the practice of their respective arts in the most unfair manner, for secret medicines are placed on the market and advertised as wonderful therapeutic inventions, when, as a rule, they are mere aggregations of old and well-known drugs, in the compounding of which no greater skill is displayed than that naturally to be expected from skilled physicians and pharmacists in the practice of their respective arts.

But when the proprietary system is analyzed from a legal point of view it becomes a serious question whether the only names by which articles of commerce are known to the public can legally be trade marks at all, because as thus employed they are not brand marks to distinguish one make of an article from another make of the same article, but appellatives to distinguish between different medicinal compounds, each of which should have and must have a name of its own by which alone it may be distinguished and dealt in.

In the above I have been dealing entirely with the question of secret articles, the art of preparing which is concealed for commercial reasons, and the commonly known appellatives of which are claimed as trade marks by the manufacturers.

There is a great deal of difference in handling this question of trade marks when considering new and useful synthetic chemical products such as antipyrin, phenacetin, and the like, as distinguished from mere mixtures of old and well-known drugs under fanciful names. New and definite chemical substances have, as a rule, names awaiting them when born, for their names are generally fixed beforehand by chemical nomenclature.

The question therefore arises whether the coined names so commonly employed to designate these chemicals are trade marks as claimed by the manufacturers,

or whether they are appellatives. In most cases the chemical names for these new synthetics are so unwieldy that the fanciful names are employed as appellatives by the medical profession in writing prescriptions, without knowledge that these names are claimed as private property, and by the trade in dealing in the remedies, so that they have become incorporated into scientific medical literature and into the common language. The patentees themselves in some instances have forced the public to employ these names as appellatives by keeping the chemical names in the background; and, as only one brand is permitted to appear on the market until the patent expires, the public cannot become familiar with the same substance under another name. This has been done with the object of retaining the name as private property, and thus perpetuating, as far as possible, a monopoly of the original brand. In some cases the manufacturers seem to have deliberately employed these fanciful names as titles for the chemicals themselves, not as brand marks, so that antipyrin and phenacetin, for example, mean certain well-known substances just as much as salt means salt and sugar means sugar.

It is but natural that the manufacturers should desire to perpetuate the monopolies as long as possible, and especially to protect their capital invested in the business of making and selling these products. And it would seem that there can be no reason why true chemical inventors should not be permitted to retain all the prestige which the reputation for inventing new and valuable products, and their successful introduction, confers. But it is a question whether a word can be used as an appellative to describe the substance itself for seventeen years until the patent expires, and then take upon itself the function of a trade mark to distinguish the brand of the introducer from new brands which may then appear on the market. It would seem that the name would have to be strictly employed from the beginning as a brand mark in connection with the commonly accepted names of the substance—not as its appellative, otherwise it must from necessity become descriptive of the substance itself, and, therefore, an appellative instead of a trade mark.

What, then, shall we do with the question of fanciful names as applied to patented synthetics as medical editors, authors, and instructors in materia medica? Shall we discuss patented synthetics in medical literature at all while the patents are in force? Shall we discuss them under their chemical names only? Or, shall we insist that the commonly employed names now claimed as trade marks be defined as appellatives and admit them freely into scientific literature? Manifestly, if the profession is to continue using patented chemicals, and there is every reason to believe that physicians will continue to prescribe them, their merits should be discussed in a judicial manner rather than to depend upon the literature sent out by their advocates, no matter how honest may be the intent; and we should not be forced to wait for seventeen years before we can find out their true value as therapeutic agents, which can only be ascertained by public discussion. Moreover, if patents on medicinal chemicals are to be permitted at all, the true intent of the patent law should be carried out so that each invention may be free to all to make and sell and all may deal in it under its commonly accepted name when the patent expires.

If, however, the manufacturers still insist that the words commonly employed by the profession to describe these new synthetics are in truth brand marks and not appellatives, then these names should be treated as brand marks and not as descriptive names. For example, in such case the word "phenacetin" would be only a brand mark on para-acet-phenetidin; or, in other words, it is the "phenacetin" brand of para-acet-phenetidin, and there would be no reason when the patent on the substance expires, why there should not be other brands of

*Reprinted from the Philadelphia Medical Journal, Feb. 19, 1898.

the same article, such as, for example, "paraphenedin" brand. During the continuance of the patent on the product there can, of course, be only one brand, but at the expiration of the patent other brands may be introduced. Monopoly is not perpetuated in a product by using a fanciful word as a brand mark, but it would be perpetuated unfairly if its commonly accepted title could be restrained from common use after the patent expires, which is accomplished unless the true name of the substance is kept prominently in view.

If the chemical names of the new synthetics are too unwieldy for use, let the Committee for Revising the United States Pharmacopœia, or some other official body, coin names which may be accepted as appellatives, and become part of the common language. Then the medical journals objecting to advertising brand marks in their reading columns, can with propriety discuss the substances either under their chemical names, or under the officially coined names as appellatives, leaving the trade names to be employed by the trade simply as brand marks, or commercial signatures.

The course pursued by the revisers of the British Pharmacopœia forms a good illustration. Phenyl-dimethyl-pyrazolone, the patented synthetic commonly known as "antipyrin," has been made official in the British Pharmacopœia under the coined words "phenazonum," (Latin name), "phenazone" (English name).

The German Pharmacopœia, however, adopted Antipyrinum as the official name, and thus its inventor received the credit which should be part of his reward for a benefit conferred on the public by publishing the invention, and resigning its name to the public domain. Whether the manufacturer in Germany still claims the word antipyrin as private property, I do not know. But I am informed officially that in this country, as soon as the patent for antipyrin expires all claims to the word antipyrin as a trade mark will be relinquished by the manufacturer, who considers the matter settled by the United States Supreme Court in the Singer Sewing Machine case, where the word "Singer" registered as a trade mark on sewing machines was declared generic by the court as a designation for that certain kind of sewing machine.

Mr. J. E. Morrison, in his address to the American Pharmaceutical Association, in 1897, throws some light on the subject. He says that the German Patent Law (April 7, 1891) states that:

"Discoveries of food stuffs, or medicinal preparations or products, which may be prepared by chemical methods, cannot be patented, but that the material of the preparations of these objects may be."

Turning to France we find the law (July 5, 1844) which is still in force is:

"May not be patented, first, pharmaceutical compounds, or remedies of every sort, these articles remaining subject to the special laws and regulations on the subject and particularly to the law of Aug. 18, 1810, relative to secret medicines."

From the same authority, I learn that in France a new pharmacy act is proposed, which sets out that none but pharmacists shall sell remedies, either compounds or simple, to be used in human medicine or veterinary medicine. The following clause is to be added to Article 9:

"These medicines and their method of preparation cannot be made the subject of a patent. Their scientific or commercial names fall into the public domain and cannot become private property, nor constitute in themselves a trade mark. Secret remedies remain prohibited."

PICRIC ACID was some time since recommended for burns, but it has recently been found by Latoche (Sac. de Chir.) that it frequently causes great pain and that serious toxic effects result from its use. This experience is also corroborated by other physicians. (Ap. Ztg.)

PHARMACY.

THALLIUM ACETATE has been employed by Combeale (Klin. Woch.) for phthisical night sweats, in form of pills containing 0.1 Gm. (1½ grains) each. The daily dose is one pill, rarely two. The remedy is not given longer than 4 days in succession, as the effects last 8 or 10 days. Toxic symptoms were not noticed, but in 3 cases complete loss of hair resulted. (Ap. Ztg.)

SANATOGEN is a new albumen preparation, made from milk casein. Its composition is stated to be sodium-casein glycerino phosphate. It is readily soluble in water and has the advantage over other preparations of this class of having a more agreeable odor and taste. The dose is a teaspoonful, with meals, taken in warm soup, cocoa, etc. It must first be stirred up with cold water. (Med. Wochenschr.)

PURIFICATION OF ALBUMEN.—To remove from albumen of animal or vegetable origin those accompanying substances that give it odor and unpleasant taste, it is heated with 10 per cent. of hydrogen dioxide solution, according to a process by Finkler. The impurities are thus converted into soluble matters, which can then be removed by washing with water, benzine, carbon bisulphide, etc. (Drog. Ztg.)

WASHABLE WALLPAPER.—To prepare wallpaper so that it can be cleaned with soap and water without injury, it is covered with a varnish made by dissolving 2 p. of borax and 2 p. of shellac, or other resin, in 24 p. of hot water. The solution is filtered and applied to the paper with a brush. When dry it is rubbed bright with a soft brush. The paper may be treated either on the walls or while still in rolls. (Südd. Ap. Ztg.)

ACETONE IN PHOTOGRAPHY.—It is stated that the alkali in alkaline developers can be advantageously replaced by acetone. Particularly in combination with pyrogallol it is said to make an excellent developer. The following formula is recommended: Water 100 Cc., exsiccated sodium sulphite 5 Gm., acetone 10 Gm., and pyrogallol 1 Gm. To obtain good negatives from over-exposed plates, the developer is first used without acetone, which is then gradually added. (Drog. Ztg.)

DISINFECTON OF LINEN WITH LIME WATER.—Beyer (Zeitsch. f. Hyg.) has found that a 7 per cent. solution of soft soap can be used for disinfecting underclothing containing cholera bacilli only when heated with it at least an hour to 50° C. and then allowed to stand 24 hours at room temperature. With typhus bacteria disinfection is not complete unless heated at 90° for 2 hours and 48 hours further standing. The same is true of diphtheria serum cultures. Beyer considered this treatment very tedious and made experiments with lime water, placing the clothing into tall and narrow vessels to prevent formation of calcium carbonate as much as possible, and filling with lime water. After standing for a time the lime water was replaced by a fresh quantity and the clothing examined after 24 hours, when the cholera germs were found destroyed. The same results were obtained with typhus, bacterium coli, staphylococcus pyogenes aureus and diphtheria. The texture of linen is not in the least injured by this treatment, cotton slightly; in color neither is affected. Wool, however, is unfavorably changed both in color and durability. Woolen stuffs are therefore to be excluded from the lime water treatment. (Drog. Ztg.)

SUBCUTANEOUS INJECTION OF QUININE HYDROCHLORIDE.—A simple method of preparing the solution, used by v. Stoffella, consists in dissolving 2 Gm. of quinine hydrochloride in 10 Cc. of distilled water with the aid of a gentle heat. The reaction of the solution should be alkaline. The injection is stated to be nearly painless and to cause no irritation. Cooled below 32° C. (90° F.) the solution becomes nearly solid, but readily liquefies again on warming. (Klin. Rundschau.)

A CLEAR SOLUTION OF COCAINE AND MERCURIC CHLORIDE is prepared for hypodermic injections, according to "Nouv. Remède," in the following manner. Place 7 parts of glycerin into a flask, dissolve 0.1 part of cocaine hydrochloride in a little water, also 0.2 part of corrosive sublimate and 0.55 part of sodium chloride in the smallest possible quantity of water and bring to a boil. Then add the latter solution to the glycerin, mix, pour in the cocaine solution in a thin stream with stirring, and make the volume up to 20 parts, with sterilized water. (Ap. Ztg.)

ONTIMENTS AND PASTES PREPARED WITH ACETIC ACID.—To assist the evaporation of the acid. Unna recommends addition of kaolin, and to retard it, combination with glycerin or a fat. The following mixtures are proposed: (1) Cooling Salve: Woolfat, dilute acetic acid, and benzoated lard, equal parts. (2) Fat Paste: Lanolin 6 p., dilute acetic acid 7 p., benzoated lard 2 p., and kaolin 6 p. (3) Glycerin Paste: Glycerin 5 p., dilute acetic acid 7 p., kaolin 9 p. (4) Sulphur Paste: Lanolin 6 p., dilute acetic acid 7 p., benzoated lard 6 p., and precipitated sulphur 2 p. (Ph. Post.)

DETECTION OF PEANUT OIL IN OLIVE OIL.—One Cc. of the oil is boiled 20 minutes with 15 Cc. of a 5 per cent. alcoholic solution of potash. Peanut oil under these conditions forms a solid soap upon cooling, while that of pure olive oil remains perfectly liquid. With mixtures of the two oils crystalline deposits are formed. With 50 per cent. of peanut oil, about 4.5 of the total volume separates in solid form within 24 hours, with 25 per cent. about 2.5, with 10 per cent. about 1.5. Addition of 5 per cent. gives a slight crystalline deposit after 3 to 4 days, which becomes fluid above 10° C. (Ph. Centh.)

GARRINE is an alkaloid discovered by Armendariz in the bark of *Garra racemosa*: nat. order, Cornaceae; habitat: Mexico. The alkaloid is crystallizable, fusible and nonvolatile. It is easily soluble in water and alcohol, and has a very bitter taste. Nitric acid colors it purple. Small doses increase the number and depth of respiratory movements. Intravenous injections of a decoction of the bark may cause death through paralysis of the respiratory centers. The drug also has the action of a bitter tonic on the digestive organs. It has been used in atonic diarrhoea in the form of tincture, of which three teaspoonfuls are given daily. The hydro-alcoholic extract, which contains the active principle, is best given combined with opium. (Bull. Soc. Ph.)

IODOFORMOGEN is a new odorless compound of albumin and iodoform. The iodoform is in loose combination, so that suitable solvents can gradually extract it. It is a light-yellow powder, insoluble in water and sterilizable at 100° C. Further advantages over iodoform are the facts that it is a dry, impalpable powder, which does not form lumps. It is three times lighter than iodoform and therefore more economical to use. Its faint odor, which, when applied even to large surfaces, is never noticeable, is the chief advantage in its use, however. Dr. Kromeyer has used iodoformogen in more than 100 cases with success, and considers it the best

dusting powder for wounds extant. (Klin-Wochenschr., through Ap. Ztg.)

SHIPPING AND STORING CALCIUM CARBIDE.—A recent English patent asserts that if freshly made carbide of calcium is cooled and then steeped for a few minutes in lubricating oil, tar or varnish, when dry the carbide can be stored a long time in air without deterioration, whereas it usually has to be shipped and stored in hermetically sealed cans. When placed in a generating machine, carbide so treated appears to develop acetylene evenly and regularly. An American invention having in view the same object has recently been patented. This claims a method of coating the lumps of carbide with a waterproof material, which prevents water or moisture from attacking the carbide, thus enabling it to be shipped loose or in bulk in open boxes. When the carbide is to be used a piece is broken in two or scraped clear of the coating, thus exposing a fresh surface. The water attacking the piece of carbide at the exposed surface gives off gas and raises the temperature sufficiently to gradually remove the waterproof coating.

EIGON PREPARATIONS are compounds of albumin and iodine of constant composition, introduced into medicine by E. Dieterich. They are placed on the market in three fundamental forms, which are used either alone or in combination. 1. *Alpha-Eigon*, or albumen iodatum, is a light brown powder containing about 20 per cent. of iodine insoluble in water, and entirely odorless and tasteless. The iodine is split off by alkalis and more readily by acids. 2. *Alpha-Eigon-Sodium*, or sodium iodoalbuminat, is a nearly white, odorless and almost tasteless powder, containing about 15 per cent. of iodine. It is readily soluble in hot and cold water. Both compounds keep indefinitely. 3. *Beta-Eigon*, or peptonum iodatum, resembles the preceding compound in properties and also contains 15 per cent. of iodine. The advantage of this compound is that the iodine is combined with "predigested" albumen and is recommended whenever an easy and rapid absorption of iodine in large quantities is desired in disturbances of the digestive tract. (Südd. Ap. Ztg.)

TYROSIN is the name given to cholesterin, as it is prepared for immunizing against snake poison. C. Pihalis some time ago made the discovery that cholesterin obtained from gall has the power of immunizing animals, to which it is administered hypodermically, against the venom of snakes, and has continued his experiments with cholesterin of vegetable sources with equally good results. That obtained from the carrot (*Daucus carota*) differs from animal cholesterin in melting at 136° C., the other melting at 146°. Tyrosin from the dahlia is very sparingly soluble in water, but is readily suspended in it in a fine state of division. Such a mixture containing 1 per cent. is easily injected, 2 or 3 Cc. are sufficient for a guinea pig and are borne without trouble. After 24 to 48 hours these animals can bear quantities of venom, which would kill in 5 to 6 hours, those not immunized. For guinea pigs a dose of 5 mg. tyrosin is usually sufficient, but to be more certain it is advisable to inject 10 to 20 mg. Immunization then lasts 25 days, though in some cases only 16 days. If tyrosin is injected simultaneously with the poison, but in a different part of the body, death will be retarded, but not prevented. When a mixture of tyrosin and poison is injected, the action of the latter is as violent as it would be without the antidote. It was found that the fresh juice from the rhizome of the dahlia acts similarly to tyrosin. 1 or 2 Cc. protecting a guinea pig against a mortal dose of the poison. The author concludes that tyrosin is neither an antitoxin nor a chemical antidote, and considers the discovery that plant juices are capable of neutralizing snake poison, of much value. (Südd. Ap. Ztg.)

DETECTION OF STARCH AND DEXTIN IN COCOA AND CHOCOLATE.—Since pure cocoa and chocolate contain a small amount of starch, care is necessary in determining whether the quantity present is sufficient to pronounce them adulterated or not. G. Posetto made comparative experiments with the pure substance and with some to which starch, flour or dextrin had been added. Two Gm. of the sample was boiled two minutes with 20 Cc. of water, then 20 Cc. more of water added without shaking, and finally 1 or 2 Cc. of a solution of 5 Gm. of iodine in 100 Cc. of a 10 per cent. solution of potassium iodide. With pure cocoa the coloration either did not appear at all, or it was slight and disappeared within 25 minutes. With adulterated cocoa the color was more prominent and did not disappear for hours. In the case of chocolate the results were the same, the color from adulterated samples remaining at least one hour. (Südd. Ap. Ztg.)

TERRALIN, A NEW OINTMENT BASE.—The discoverer of this preparation, Dr. Eichhoff, makes the following demands of a perfect ointment vehicle: It must keep well; be non-irritating; be at least in part absorbed by the skin; must not cover the skin hermetically; must be compatible with the usual therapeutic agents; should be an agreeable cosmetic, and, finally, not be expensive. All these requirements are stated to be met by Terralin, which is composed of exsiccated calcium sulphate, kaolin, siliceous earth, lanolin, glycerin, and indifferent antiseptics. The mixture has a whitish-yellow color, an agreeable, "aromatic-earthy" odor and the consistence of lanolin. Medicines to be incorporated with it should not be rubbed up with fatty oils, but with glycerin, or with lanolin and alcohol. If either of these is unsuitable, a little vaseline may be taken. Ointments made with terralin fulfil all conditions given above, and are expected to be particularly useful as being intermediary in form between fatty ointments and pastes. They can be readily removed from the skin with water, without the aid of soap or soda. In addition to these advantages terralin is also suitable as a protective for the skin, in all cases in which it is desired to protect it from external influences, as heat and light. Finally it is adapted as a substitute for grease paint of all kinds, as it readily takes up all shades of color and by reason of its consistence readily fills out wrinkles. (D. Med. Ztg., through Ap. Ztg.)

Clothes From Rocks.

An Indiana chemist has applied for patents on a process for making wool from limestone. After some sort of chemical treatment the rock is subjected to a drawing-out process, by which, it is said, it is converted into the finest and most pliable wool, of beautiful white color and soft as down. Many industrial applications of this product are apparent, but a most notable probability is that it may be woven into fabrics for clothing, etc. Experiments are now in progress to determine its capabilities and limitations in this respect. If it be found that it can be woven into a satisfactory fabric and that it can be suitably dyed, it would certainly be a most important product. As it is both waterproof and fireproof, and quite approaches indestructibility, one would have to patronize one's tailor very infrequently. We accept the fireproof suit of rocks as a possibility; now if anyone will tell us how to fill the pockets of that suit with rocks we shall be content.

EUPHORIUM IN TUBERCULOSIS.—Penièdes (Bull. de Thérap.) has successfully treated local tuberculosis with subcutaneous injections of very weak solutions of Euphorium resin. The best preparation of the resin is an alcohol-free emulsion, of which 1 Cc. contains 1 milligramme. As a rule, one week's treatment was found sufficient. (Ap. Ztg.)

"PER ALGRETTA."

"Per algretta" is a so-called "egg preservative" exploited from New Concord, O., the home of "black pepper," a "fake" preparation repeatedly exposed in this journal during 1892-3, and also by the chemists of the Department of Agriculture, at Washington. The methods used by the exploiters to push the sale and introduce "per algretta" stamp it a preparation of like ilk. Its claims are fully set forth in a "monthly" periodical published at New Concord, which states that it (the publication) is "devoted to poultry interests in general," but whose real purpose is to advertise "per algretta," "terra fusus," etc. These preparations are advertised as being carried in stock by a number of leading wholesale druggists in various large cities, but those named of this city say they have never had it in stock, nor could they buy it from any of the other dealers.

The directions for preserving eggs by the "algretta method," as set forth by a "correspondent" in the publication referred to, and who bought "\$5,006 dozen of eggs in 1896," and who "cleared \$21,924.62 on an investment of \$100 only three years before," are as follows: "Take 36 gallons of water, put in it 18 pounds of unslacked lime, and 6 pounds salt stir it several times for a day, then let settle and draw off all that is clear; then take 4 ounces per algretta (\$2.50 package), 8 ounces baking soda, 8 ounces Cream Tartar, 8 ounces salt peter, and 8 ounces borax; dissolve them in two gallons boiling water, and put in your clear lime water, this will cover 300 dozen eggs. It costs about one cent a dozen to preserve them. The Per Algretta keeps the eggs fresh and fresh looking; some druggists do not have it in stock, but can get it for you, as all wholesalers have it."

It is but fair to quote this correspondent's statement that he "was not able to put up eggs last year, and being broken in health, he is going to Ireland this month to end his days at his old home."

"Terra Fusus," exploited by the same concern, is described as a "new preparation for preserving all kinds of fruits and vegetables," and probably a "companion" to "salxy," another of the concern's "fruit preservatives." The latter may be an abbreviated name for "compound extract of salxy," a fraud exposed in the Era in 1893 and found by the Department of Agriculture to consist purely of salicylic acid. If we mistake not, it originated from the same town in Ohio, a State which needs pure food laws and their strict enforcement.

WHAT DRUGGISTS MUST KNOW.

5ct Glycerine and 5cts Toulon Sperate
5 cents Worth Anesthetic
Baby due (O. L. Dewee's) Carnubative.
5c of your best Pepsin gum
Plaster Parish 1lb
Please send me 1 Bot Mucilage
brommer Selser.
5 Celsine
10 c Balsom Compedia
8Cotts Multwhia
5 cent ground flace Seed
Medellmentum Gratus Probatum (Harlem Oil.)
5 cts. ground Super Elm.
5 cts. Salt Peacher
10 cts. Cankana Wine.
One Pice (Cubale Soap, 5c
Mr. — please let beure have 5 cents of Carabine peper
(Cayenne pepper.)
Mr. — give this girl 15 cent worst of cockean powder
and don't let her know what it is for 1 am sick and I don't
want her to know.
2601 Dauphine St., New Orleans, La.

NO SHORTER DAY FOR BAY STATE DRUG CLERKS.

Boston, March 31.—Drug clerks here in Massachusetts will have to work just as many hours as they have in the past; that is to say, unless they can effect some private arrangement with their employers. This statement is suggested by the fact that the movement begun to relieve them has come to a sudden end. There was a time limit, or shorter day, bill under consideration at the State House, which received warm support in some quarters; but the Committee on Labor has presented an adverse report, and the report has been adopted.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Queries of Non-Subscribers Not Answered.

W. L. Knuth, Springfield, O., and Hugh McH., Corinth, Miss.: See rules at the top of this column.

Extract Vanilla.

(A. S. H.) See this journal August 12, 1897, page 207, and January 27, 1898, page 150.

Remedies for Dandruff.

(A. C. M.) See February 10 (page 210) and March 10 (page 363) issues of the Era, this year.

Oil for Floors

(A. C. M.) See December 30, 1897, and February 10, 1898, issues of this journal, pages 1,000 and 212, respectively.

Flash Light Powder.

(G. E. S.) See this journal, March 18, page 333; April 8, page 422, and November 11, 1897, page 719; also March 3 issue of the present year, page 329.

Light Brown Hair Dye.

(A. S. H.) One of the most common methods of bleaching hair is by means of hydrogen peroxide, the details of the process being given in the March 3 Era of the present year, page 329. Formulas for dyes to color hair various shades of blonde may be found in the issues of August 5 and October 7, last year, pages 176 and 502, respectively.

Gum Arabic Soda Foam.

(E. R.) Take of gum arabic 8 ounces and water, 1 pint. Wash the gum arabic with water to free it from impurities, and add the water, stirring occasionally until dissolved. Used in the proportion of 3 or 4 ounces to 1 gallon of syrup.

Several formulas for the manufacture of "foam producers" may be found in this journal, July 22, 1897, page 112.

Coloring Oil of Turpentine.

(W. M. F.) Oil of turpentine may be tinted by means of the aniline dyes soluble in it. The dyes required to produce the shades you name will have to be determined by you by experimenting. Various resins soluble in turpentine will impart to it shades of yellow. Varnishes and lacquers made in part with oil of turpentine generally have the pigment or staining agent added after the solution of the gum or resin, the latter holding the coloring agent, if not soluble, in suspension in the mixture.

Iodine and Oil of Spike.

(O. F. C.) The action of iodine upon oil of spike is analogous to that taking place between iodine and oil of turpentine, a subject discussed in this journal March 24, 1898, page 440. True oil of spike is obtained from a broad-leaved variety of lavender which grows wild in Europe, and should not be confounded with some of the mixtures of oil of turpentine, Barbadoes tar, oil of juniper wood, whale oil, etc., sold under this title and used as horse liniments. Iodine is incompatible with all essential oils, the violence of the reaction depending upon the preparations in which the iodine and oil are brought together.

Restoring Oil of Lemon.

(T. W. K.) To restore old and rancid oil of lemon Curieux recommends a strong solution of borax, which is mixed with animal charcoal, and then agitated with the oil. For large quantities the simplest process is, perhaps, redistillation with water, and sometimes with a little alkali. Another process consists in mixing the oil with a solution of permanganate of potassium in the proportion of 1 ounce of the salt to 8 ounces of water; this quantity is said to be sufficient for 4 pounds of the oil. The mixed oil and the solution are then agitated together for some time, when the oil is decanted, mixed with fresh water, and warmed gently until it floats on the surface.

Soda Mint. - A Correction.

(S. B. H.) Formula No. 3,215, page 271, Era Formulary, should read:

Soda Mint.

Sodium bicarbonate	1 ounce
Aromatic spirit of ammonia	1 ounce
Spearmint water	2 ounces
Water, enough to make	16 ounces

The omission of the water to make the mixture measure one pint is due to an oversight in proof-reading. Anyone at all familiar with the uses of these preparations will see at a glance that the formula is necessarily incomplete as the Formulary gives it. The mixture is one prescribed by a physician for nausea, acidity of the stomach, etc.

Milk Preservative.

(J. H.) We cannot give the formula for the proprietary solution. However, it is stated on good authority that many preparations for the preservation of milk are nothing but boracic acid either singly or in combination. According to Prof. Caldwell, it is said to be the best antiseptic for preserving milk or keeping it sound for an unusual length of time. About 1 part of acid is required for 1,000 parts of milk. The employment of antiseptics for the preservation of food products has been a mooted question for years, many medical men claiming that such substances were a source of danger to the consumer. Boards of health and food commissioners in this country have generally held their use to be illegal.

Preparation of Morphine Oleate.

(D. J. H.) Some years ago S. A. McDonnell, of San Francisco, Cal., presented the following formula in a paper read before the American Pharmaceutical Association:

Solution Oleate of Morphine, 10 Per Cent.

Oleic acid	450 grains
Morphine sulphate	53 grains

Mix, place on a water bath and add gradually 25 minims concentrated water of ammonia, stirring constantly until a perfect solution takes place (about 10 minutes). Some specimens of morphine sulphate may require a few drops more or less ammonia to effect solution. The heat dissipates any free ammonia nor is there any indication of the formation of a soap in view of the nature of the combination. The mixture is said by the author to be all that can be desired, and he recommends it to anyone requiring oleate of morphine, it not being kept in stock.

In preparing oleates of the alkaloids it must be remembered that only the free alkaloids, and not their salts, are soluble in oleic acid, hence the addition of ammonia water in the above formula. Perhaps an improvement in the method given would be to dissolve the morphine sulphate in a small quantity of water and then add the ammonia water somewhat diluted, with constant stirring, until it is in slight excess. The precipitated alkali may then be collected on a filter, washed with cold water to remove most of the soluble ammon-

ium salt present, and dried at 100° C., when it is ready for solution in the oleic acid.

Liquid Glue.

(F. S.) The Era Formulary is the authority for these:

1. Fill a jar or bottle with small pieces of glue, and cover with acetic acid. Then place in a vessel of hot water for several hours, until all the glue is dissolved.

2. A solution of 8 ounces of glue in $\frac{1}{2}$ pint of water is made. To this add $2\frac{1}{2}$ ounces strong nitric acid, stirring all the while. Effervescence will take place with the evolution of orange nitrous fumes. When all the acid has been added, the liquid is allowed to cool. Kept in a well-stoppered bottle, it will remain permanently liquid.

3. Acetic acid	4	ounces
White glue	3	ounces
French gelatin	4	drams
Shellac varnish	4	fl. drams
Distilled water	4	ounces

Dissolve the glue in the acid with heat, and the gelatin in water with heat. Mix the two solutions gradually until homogeneous, then add the varnish, and put into bottles.

"Face Oil."

(W. L. K.) We know of no preparation under this title. A cosmetic lotion of an oily nature frequently recommended is lime juice and glycerin. This preparation usually contains no lime juice and rarely any glycerin, and should not be confounded with the preparation under the same title intended for internal use.

Lime Juice and Glycerin.

1. Olive oil	8	fl. ounces
Lime water	8	fl. ounces
Oil lemon	2	drams
2. Borax	$\frac{1}{2}$	ounce
Boiling water, to dissolve borax, ..	10	ounces
When cold add oil sweet almonds, ..	20	ounces
Oil lemon	$\frac{1}{2}$	ounce
3. A "skin food" of which fat forms the basis may be prepared as follows:		
Sodium borate	2	drams
Rose water	2	ounces
Dissolve and mix with olive oil, ..	8	ounces
Carbolic acid	30	grains

If cottonseed oil is used, the proportion of borax may be increased so as to produce a creamy mixture. Said to be "healing, cooling and antiseptic."

A New Label Holder.

(J. R. W.) asks our opinion on a label holder for dispensing bottles for which he has been granted a patent. The label holder may be described as a small rectangular "pocket" 2 x 1 $\frac{1}{2}$ inches in size and of sufficient thickness to hold a number of labels. In the back of the holder is a tongue-spring to hold the labels in position. The holder may be made of celluloid or other material, and it is designed to be cemented or glued to the back of dispensing bottles.

Our correspondent's idea as worked out in the sample submitted shows some ingenuity but we fear the use of the holder will prove it to be impracticable. Labels are best kept in drawers away from dust and dirt and when placed in a holder on the back of a dispensing bottle, which, of necessity, must stand on a shelf, they cannot help but become dirty and soiled from accumulation of dust. Such a holder when placed in position will also be in the way of cleaning the bottle, a performance which must be frequently and often hurriedly done. A strong claim for "recessed" shelf ware is that the labels are so set in the recess that their surfaces are flush with the outside of the bottles, which enables the latter to be cleaned without injury to the edges of the labels. It is for this reason that we think any projection on the back of a bottle will prove impracticable.

It is probable that J. R. W.'s holder may be satisfactorily made from celluloid, though upon this point he

should consult some celluloid expert. Write to the Celluloid Company, 30 Washington Place, New York.

Seidlitz Mixture.

(W.) "Seidlitz mixture" is the term employed by manufacturers for the mixture of potassium and sodium tartrate with sodium bicarbonate used in making Seidlitz powder. This mixture is usually made up in considerable quantity, the "mixing process" being done by machinery, instead of by hand. It is for this reason that manufacturers are enabled to quote the mixture at a price but little in advance of the aggregate cost of both ingredients. The proportions for any quantity may be easily calculated by referring to the formula for Seidlitz powder in the Pharmacopœia. Thus, for about 8 (7 $\frac{1}{2}$) pounds of "mixture" it will require:

Sodium bicarbonate	.31	tray ounces
Potassium and sodium tartrate ..	.93	tray ounces

Mix.

When required for use the mixture is weighed out in the quantities required for each powder (10.33 grams or approximately, 2.23 drams).

"Though the term "Seidlitz mixture" is in common use by the trade in ordinary business and in all price lists, we fail to find it in any reference work at hand. Its application, however, is a matter of common knowledge.

Haarlem Oil.

(McC.) There seems to be considerable difference in the various preparations sold under this name, as to quality and ingredients used. One of the most common formulas is the following:

Linseed oil	1	quart
Resin	2	pounds
Sulphur	1	pound

Boil together over a slow fire, and add 1 pint oil of turpentine and about a dram of water of ammonia; stir well together and bottle.

Hager gives the following:

Balsam of sulphur	1	part
Oil of turpentine	3	parts

The balsam of sulphur and turpentine should be mixed in a glass dish, thoroughly agitated, and should then be digested on the water bath for a long time, being shaken occasionally. The mixture should be allowed to stand two or three days in a cool place and then decanted. Should the resultant fluid not be quite clear, about one-half of 1 per cent. of powdered caustic potash should be added, the mixture well shaken, allowed to settle and then decanted.

The same authority also states that the following is dispensed for Haarlem Oil, Dutch Drops, Haarlem Balsam, etc.:

Sulphurated linseed oil	5	parts
Oil of turpentine	10	parts
Oil of cade, or camphrenatic oil of juniper	20	parts

Mix, digest in a moderately warm place and decant. The sulphurated linseed oil and balsam of sulphur are identical, and may be made by heating 100 parts of linseed oil to 120° C. in a large iron or earthen dish and then adding gradually in divided portions 16.6 parts of powdered and perfectly dry sulphur, and continuing the heat with stirring until the mixture is of uniform consistency.

A formula from another source is this one:

Sulphurated oil	3	pints
Barbadoes petroleum	1	pint
Oil of amber, crude	1 $\frac{1}{2}$	pints
Oil of turpentine	8	pints
Linseed oil	1	pint

— Nine Covington, Ky., druggists have been indicted by the Grand Jury for failing to file their registration certificates with the county clerk. They are Jefferson D. Snyder, Paul A. Kolbe, F. A. Pope, J. M. O'Maley, Henry Biehler, Robert J. Scott, Carl Kaifer, John Schulte and Michael Glase.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, APRIL 14, 1898.

No. 15.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates:
U. S., Canada and Mexico..... \$3.00 per annum.
Foreign Countries (Post Union,..... 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483,
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 124 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

	PAGE
EDITORIAL.....	535
Formula for Perfumes.....	538
Making and Filling Soft Gelatine Capsules.....	538
ERA COURSE IN PHARMACY.....	539
Inorganic Chemistry.....	539
The Pharmacist and His As- sistant.....	541
Pharmaceutical Nomen- clature.....	543
Note on Liquid Phosphorus	543
New Derivatives of Vanillin	544
PHARMACY.....	545
QUESTION BOX.....	548
Drug Clerks Fined for Sell- ing Poison.....	550
NEWS AND TRADE DEPART- MENT.....	551
Mayor Van Wyck Gives Hearing on Shorter Hours	551
Dr. Humphreys' Pleasure	551
Trip.....	551
Boston Drug Clerk Mur- dered.....	552
Clerk Forty-one Years.....	552
Annual Meetings of Two Druggists' Associations..	552

	PAGE
Explosion Wrecks a Drug Store; C. E. Bailey; Kings County Society Fighting Obnoxious Leg- islation.....	553
Fg Syrup Company En- joins C. E. Warden & Co.; The Western University; New Ruling on Importa- tions of Medical Prepara- tions; Figures of Phar- macy in New York City..	554
NEWS LETTERS.....	555
OBITUARY.....	562
COLLEGES.....	562
BUSINESS RECORD.....	563
ASSOCIATIONS AND BOARDS	563
Kentucky Pharmacy Law..	564
DRUGGISTS' ADVERTISING.	565
Kings County Pharmaceu- tical Society.....	568
The Store-Boy.....	569
NEW BOOKS.....	570
The Chemistry of Stains.....	570
STATE OF TRADE.....	571
MARKET REPORTS.....	572

THE NEXT ERA.

The issue of the Era of next week (April 21) will show observance of a well established custom of trade journalism which consists in giving to readers, at more or less frequent intervals, "special editions." The forthcoming issue will therefore be special, or extra, in several respects. Its circulation will be greater than usual, so that every leading drug buyer of the country will receive a copy, and the occasion is one of advantage to both the Era and its advertisers. There is opportunity for both to make new friends. The advertisers have made special efforts to call attention to their best goods and best prices, and their announcements will be profitable reading for the druggist who watches closely the buying end of his business.

In addition to the regular departments, the special issue will contain quite a few original articles upon special topics. Among these may be mentioned an article on "Retail Drug Advertising," by a writer who has had much practical experience in this line; two articles upon the soda water business, which will interest both by their merit and timeliness; one article upon "The Relation Between Retailer and Jobber;" one article upon the "Package Dye Business," one upon the "Chewing Gum Industry," and one about "Chalk." With this menu published in advance our readers may anticipate a full measure of both pleasure and profit from the issue of April 21.

The Bennett Bill in Ohio.

As related in our news columns last week, Food Commissioner Blackburn, of Ohio, is right in the middle of a hot fight over the so-called Bennett bill, now pending in the Ohio Legislature. The ostensible purpose of this bill is to prevent the sale in Ohio of dangerous and poisonous proprietary medicines and to enable the commissioner to secure easy and prompt punishment of the offenders. The means by which these two aims are to be obtained are considered very objectionable by many. In the first place, the bill requires that every proprietary medicine containing poisons shall bear the skull and cross-bones label and also the formula of the preparation. This would not be an unjust restriction if it were applied to the dangerous and harmful medicines only, but it distinctly applies to all articles containing certain named poisonous substances in any quantity however minute.

We do not think this a wise provision. It may be said with truth that the majority of patent medicines cannot be considered distinctly dangerous, even when they may contain potent principles. There can be no law too strict to apply to secret medicines which contain arsenic or chloral or morphine or cocaine in such quantities that they constitute a direct and positive menace to the public safety. Any so-called patent medicine which contains one or more of these articles in quantity sufficient to work injury to the continual consumer thereof, or which through careless or ignorant use would result in great harm or death, should be debarred entirely. But the great majority of patent medicines are not directly harmful. Among this class are preparations which may contain small amounts of poison or narcotic, which is directly beneficial and necessary in medicines of this nature, for instance, a very little morphine in a cough medicine. It would be an injustice to require such preparations to bear a flaming poison label and the full formula, as this would cause distrust and opposition in the purchasing class. We are willing to go any length in support of the authorities in Ohio or any other State to prevent the use of harmful adulterated and poisonous materials, but the line of discrimination between what should be under the ban and what not must be very carefully and honestly drawn. There is a decided difference between prosecution and persecution. We would oppose by every means a directly harmful secret medicine, and there are some of these. But we would not apply these rigorous restrictions to all proprietary articles without discrimination. All that can be expected is to protect the public health and life against criminal act.

Another provision of the Bennett bill which is distinctly obnoxious is that providing that justices of the peace shall have full and final jurisdiction in all cases of prosecution for violation of the aforementioned regulations which may be brought before them. The objection to this provision is that it does not allow a fair show. The ordinary justice of the peace cannot fairly be expected to intelligently adjudicate in one of these prosecutions. It often becomes a very delicate matter indeed to decide where safety ends and danger begins in the nature of a certain medicine, and this should not

be left without appeal to the discretion or lack of discretion of the justice. The offender complained of in cases of this sort should have as fair a show as the offender in any other law.

We want to see pure food and pure drugs and safe food and safe drugs just as much as anyone else; but while approving of the ostensible purpose of the Bennett bill we decidedly object to the provisions pointed out which are calculated to work injustice, and that without accomplishing the good intended. There is too much politics in most of these reform food laws.

Pure Food Laws.

In a recent editorial upon this subject the American Grocer expresses some very sensible views. Much of its remarks we take the liberty of using with but little alteration, as bearing directly upon the druggists, as well as the grocer's, relation to the laws. In commenting upon Great Britain's food law, it says:

"The food and drugs act of the United Kingdom has a provision which provides for exemption of a dealer who ignorantly sells an article that is adulterated according to the legal definition. It is as follows:

"Provided, That no person shall be liable to be convicted under either of the last two foregoing sections of this act in respect of the sale of any article of food, or of any drug, if he shows to the satisfaction of the justice or court before whom he is charged that he did not know of the article of food or drug sold by him being so mixed, colored, stained, or powdered as in either of those sections mentioned, and that he could not with reasonable diligence have obtained that knowledge."

In reference to the application of such a provision as that just quoted, our contemporary goes on to say:

"In Ohio the courts hold that ignorance of adulteration is no defense. The late Commissioner McNeal, in his report to the Governor in 1897, expresses his gratification that the Supreme Court sustained the holding of dealers responsible for the quality of goods they sell, regardless of whether they know their condition or not. The seller must alone take the responsibility for the quality and legality of every article sold.

"A law so interpreted works a great injustice to many innocent dealers, as, for instance, in the case in England, where a retailer was arrested and tried for selling butter which contained harmful acid. Many a dealer is the innocent purchaser of butter containing such a preservative, who cannot possibly have knowledge of the fact without having a chemical test made of every lot of butter purchased."

We have always held that the pharmacist, being a specially educated man, could and should reasonably be required to assure himself of the quality of much if not most of the articles he handles. This is a duty incumbent upon him from the fact that the public intrust their safety and health to him because of their belief that he is qualified to ascertain and does know the quality of the medicines he dispenses to them. He occupies a higher position in the public regard than a mere hand-out of wares. But the grocer is not possessed of the special knowledge to value his goods, and we can agree, without invalidating our position regarding the druggist, with what the Grocer next says:

"It is asking too much that the retailer should be able to apply chemical tests or go beyond exercising, when purchasing, diligence beyond what may reasonably be expected of an honest dealer. This is especially to be observed in cases where an article of questionable character is used in such a manner as to defy detection except by analysis, and which if used, is not prejudicial to health, as, for instance, French peas artificially colored with copper, or an article in which a preservative has been used, as sweet tomato catsup.

"The English law, with its very wise provision, seems to be ample to protect the public without creating suspicion as to the honesty of the vendors."

In default of such protection in this country, the druggist will do well to heed the advice frequently tendered him, and procure from his jobber or manufacturer an agreement to protect him.

The Grocer takes a stand regarding baking powder which will perhaps seem a little unusual to most of us,

who have thought and taught that this article must be "absolutely pure," a belief hammered into us undoubtedly by the advertisements familiar to us for many years. It mentions that in several of the States a great ad is made about baking powder, which in no sense is a food, but, rather, a food accessory—a baking tool, which is dissipated or dissolved in the using. In Bulletin No. 2, the Ohio Food Commissioner says that "probably 90 per cent. of the baking powders now on this market are, in my opinion, totally unfit for use." That seems an extravagant statement to make of an article that is a mere leavening agent, and almost mechanical in its workings.

"The English courts hold that baking powder is not an article of food, and neither the sale nor the mixture with it of an article of food is an offense. That is sensible. The only possible question that can arise as regards baking powder is as to the character of any residue which may result from its use, and which would, in any case, be so infinitesimally small and so dissipated through a mass of food that it is beyond the limits of possibility for any person to take into the system a quantity in the slightest degree prejudicial to health."

We can, in conclusion, heartily concur in our contemporary's assertion that our food laws are imperfect and need careful revision, so that the rights of the dealer may have as fair and equitable consideration as those of the consumer.

Pharmacy Laws Punish Rather Than Protect Pharmacists.

The Pharmaceutical Association of Maryland, backed by the majority of druggists of the State, has been endeavoring to secure the passage through the Legislature of a bill covering the practice of pharmacy, and which will be applied to the whole State. Pharmacy regulations in operation at present affect only the city of Baltimore. As said before, this effort has had the support of the majority of druggists. The bill drawn up is in most particulars the same as those which are in force in other States, the general provisions of which are well understood. But a rather unusual form of opposition has come to light, and that from a quarter where least expected. Beside the usual protest from those ignorant of what it is hoped to accomplish and what is needed, a well known and influential druggist appears in print in the Baltimore papers in indignant opposition. As some of his arguments are so peculiar it is interesting to particularly note them. In the first place, he thinks the bill should be termed an Act to Punish Pharmacists for Practicing Pharmacy. He argues that it regulates pharmacy by imposing a fine on those who engage in it in an open manner, and, on the other hand, invites the sale of pharmacists' wares in the department and general stores, by explaining to them how nicely it can be done, hinting at increased profits, saving of time, etc., by having their drug assortment made up into packages ready to handle and already labeled, assuring them that they can obtain anything and everything they desire, by simply ordering from some manufacturer who stands ready to supply any grade in any time.

When we come to think of this criticism carries some weight. Nearly all the pharmacy laws in force make exceptions in favor of general stores and the sale of package preparations. For instance, wholesale druggists can peddle packages of medicine without let or hindrance throughout the State, but he who would sell these articles in small quantities and particularly on physicians' prescriptions, must pay a fee to the State and be duly registered as a pharmacist. This argument, however, properly applied would go to show that there should be no exceptions, but every one who deals in medicine should show his competence to do so.

This indignant protester objects to all provisions of the proposed law which allow any person other than a duly qualified and registered pharmacist to engage in the sale of medicines. He argues that the exceptions which he names constitute unfair competition for the qualified man. We are inclined to thoroughly agree with him in this position. It must not be forgotten, however, that pharmacy laws, like all other laws, are in-

tended not for the protection and benefit of a particular class, the druggists, for instance, but of the great public. It is very hard to educate legislators to the point where they see any particular danger to the public, or to anyone else, in the sale by ordinary tradesmen (not pharmacists) of patent medicines and the usual household remedies, etc., and it is to allow of such sales that the exceptions are embodied in the law. The ordinary individual holds fast to his inborn right to prescribe for himself if he wishes. Since the world began he has been a believer in secret remedies, and till the last day his faith in some degree and kind will remain with him. It is, therefore, almost, if not quite, impossible to pass a law which shall confine the sale of proprietary medicines to the hands of pharmacists only. Something can perhaps be done in the way of sanitary laws or pure food and drug laws, which shall prevent altogether the sale of distinctly harmful and poisonous secret medicines, but this is about all that can be expected. It will, indeed, be a happy day, and mark the millennium almost, when all medicines and remedial agents are confined to the care of those who can prove themselves capable by education and experience to intelligently employ them.

Since the above was written it is learned that the attempt to secure a State pharmacy law for Maryland has failed. Two members of the Board of Pharmacy for Baltimore have resigned therefrom, in consequence.

Secret Medicines in Germany.

Inasmuch as it is forbidden in Germany to sell secret remedies, it is interesting to learn in what manner this restriction affects proprietary medicines. A very large proportion of proprietaries are also secret, and all such come directly under the ban. The Ministry of Commerce and Industry has recently announced certain rulings which very definitely establish the status of such articles. It requires that any remedy not sold upon a prescription from a doctor must have the formula of its contents printed upon the label, and, a very significant provision, this formula must be written, not in Latin, but, whenever possible, in the vernacular. It must be intelligible not only to a doctor or pharmacist, but to anyone who wishes to buy, and it must be sufficient to enable a buyer to decide whether the ingredients contained therein are such as may be reasonably expected to give relief, and whether he is paying a not reasonable price for the amounts of the different drugs which are being bought. As the merit of the invention is the method of composition of the remedy, this need not be given if there is a real discovery in it, so that the inventor does not lose the benefit of his idea. There is not very much comfort in all this for the ordinary patent medicine man. If he must print his formula, if his preparation must reasonably be expected to give relief, if he cannot exact an unreasonable price, he will find little satisfaction in the permission to preserve the secret of the method of manufacture. It is hardly to be expected that Germany will hereafter figure very extensively in the statistics of the patent medicine business.

Whisky Druggists.

Here is a partial record for a couple of weeks past. A druggist at Willow City, N. D., is under bonds for trial for violating the prohibition law; his brother, who operated a drug store at Omamee, same State, is in jail awaiting trial for the same offense; two clerks in a drug store, at Dublin, Ga., have been fined \$150, or ninety days each on the public works, for selling liquor contrary to the city law; two prominent druggists of Guthrie, Okla., have been arrested on indictments charging them with selling whisky without license; the druggists of Atlanta, Ga., are fighting the ordinance which permits them to sell liquor only in genuine, prescribed medicine; two druggists in Wyandotte, Mich., are reported to have been selling without license; the saloon-keepers

of Grand Rapids are proceeding against certain druggists whom they accuse of running bars and free lunch counters without the protection of retail liquor dealers' licenses, and from other parts of the country comes news of like general nature. We note these reports in this place merely to introduce and excuse the question, is it not possible and about time to settle the liquor question in such a manner that honest druggists may be allowed the privilege and protected in their right to sell and use liquors in their business in a legitimate manner, and at the same time make impossible the reproach which the rascals in the business bring upon it by their unlawful and disgraceful acts?

A Claim to Cure Must be Substantiated.

A concern which manufactures a well known, so-called "consumption cure" is trying to punish another concern which is imitating its name, preparation, package, etc. Company 1 asserts that its preparation will help or cure pulmonary ailments and assist or cure consumption. Company 2 does not deny similarity of its package, name, etc., but alleges consumption cannot be cured by patent medicines. This Company 1 says it can do. The legal aspect is that a contract which cannot be made good cannot be enforced in law. Company 2 is reported to have secured the depositions of physicians in its behalf and defense.

We will all be interested to learn how this plea works. If allowed it would establish a precedent not very satisfactory to patent medicine manufacturers in general.

A well known druggist in Portland, Me., has been put to a great deal of inconvenience and annoyance recently by the actions of an unprincipled sharper who has been traveling around that section of the country. This rascal has been selling a mixture of his own concoction, representing to his customers that it was the proprietary medicine owned by the druggist in question, and that if it did not cure their particular ailment they could get their money back by going to this druggist. The result has been a constant stream of people from the surrounding country who have been applying at the druggist's store to get their money back. To stop it all the druggist sent a postal card to the authorities of the surrounding towns offering a reward for the arrest of the swindler, and in consequence the rascal has been caught and jailed. There are several morals which might be drawn from this little tale, but one which is, perhaps, as good as any, is that it is easy to sell an article which has a good name back of it.

The Highland Chemical Company is the name of a combination of the leading druggists of Butte, Mont., formed for the purpose of manufacturing and selling to druggists who own one or more shares of its stock a line of preparations intended to take the place of some of the principal proprietary goods in the market. The co-operative manufacturing idea has its disciples in many sections of the country, and several of these combinations seem to be reaping a fair measure of success. The movement is one which is watched with much interest and, some say, much anxiety by proprietors, especially those who have rather indiscriminately and widely made the charge of substitution.

The proprietors of Worcestershire Sauce were both druggists in earlier life, and it was while practicing druggists that they started the manufacture of the condiment which brought them fame and fortune, the latter to the tune of five million dollars to each. A little pharmaceutical knowledge, the ability to concoct, compound, brew and stew crude materials, has often led to great financial reward, but this is a particularly notable instance.

FORMULÆ FOR PERFUMES.

The following formulas have been arranged by Pharm. Jour. for the benefit of readers who ask for information on the subject from time to time.

Essence of White Clover.

Vanillin, 20 grains; heliotropin, 20 grains; coumarin, 20 grains; tincture of storax, $\frac{1}{2}$ ounce; tincture of civet, $\frac{1}{2}$ ounce; tincture of orris, 1 ounce; otto of rose, 60 minims; oil of bergamot, 60 minims; oil of neroli, 90 minims; extract of tuberose, 4 ounces; extract of jasmin, 8 ounces; oil of cloves, 5 minims; oil of bitter almonds, 5 minims; terpineol, 60 minims; rectified spirit, 8 fluid ounces; glycerin, 1 fluid drachm.

Essence of Crab Apple.

Niacinthin, 5 minims; erategin, 10 grains; oil of ylang ylang, 30 minims; volatile oil of nutmeg, 10 minims; oil of lignalee, 20 minims; oil of wintergreen, 2 minims; musc Baur, 10 grains; extract of cassie, 2 fluid ounces; extract of violet, 4 fluid ounces; tincture of orris, 1 fluid ounce; glycerin, 30 minims; extract of jasmin, 4 fluid ounces.

Essence of White Iris.

Ionone, 3 minims; oil of orris, 10 minims; heliotropin, 30 grains; terpineol, 60 minims; oil of ylang ylang, 20 minims; oil of lingalee, 5 minims; solution of amyl acetate, 10 per cent., 5 minims; glycerin, 20 minims; essence of jasmin, to make 10 fluid ounces.

Essence of White Violet.

Ionone, 60 minims; musc Baur, 10 grains; essential oil of orris, 10 minims; extract of violet, 18 fluid ounces; extract of rose, 2 fluid ounces; oil of sweet orange, 5 minims; oil of lingalee, 5 minims; solution of amyl acetate, heliotropin, 30 grains; terpineol, 5 minims; solution of oil of patchouli (1 in 10), 20 minims; glycerin, 30 minims.

Essence of Wallflower.

Essential oil of orris, 2 minims; oil of sweet orange, 1 minim; heliotropin, 5 grains; oil of neroli, 2 minims; extract of orange, 2 fluid ounces; extract of tuberose, 2 $\frac{1}{2}$ fluid ounces; extract of jasmin, 15 fluid ounces; coumarin, 3 grains; glycerin, 30 minims; oil of bitter almonds, 5 minims.

Essence of Heliotrope.

Heliotropin, 30 grains; essence of jasmin, 4 ounces; oil of ylang ylang, 5 minims; oil of bitter almonds, 2 minims; erategin, 1 grain; oil of neroli, 10 minims; oil of lingalee, 30 minims; terpineol, 10 minims; otto of rose, $\frac{1}{2}$ minims; rectified spirit, 10 fluid ounces.

Essence of White Lilac.

Terpineol, 3 drachms; heliotropin, 20 grains; extract of rose, 2 fluid ounces; oil of ylang ylang, 10 minims; extract of jasmin, 4 fluid ounces; rectified spirit to produce 20 fluid ounces.

Essence of Lily of the Valley.

Extract of tuberose, 6 ounces; extract of jasmin, 8 ounces; tincture of civet, 1 ounce; oil of lingalee, 30 minims; terpineol, 10 minims; oil of sweet orange, 2 minims; heliotropin, 20 grains; oil of neroli, 3 minims; glycerin, 20 minims; tincture of chlorophyll, 30 minims; extract of rose to produce 20 fluid ounces.

Essence of Narcissus.

Caryophyllin, 10 minims; extract of tuberose, 16 fluid ounces; extract of jasmin, 4 fluid ounces; oil of neroli, 20 minims; oil of ylang ylang, 20 minims; oil of cloves, 5 minims; glycerin, 30 minims; solution of amyl acetate, 10 per cent., 20 minims.

Essence of Wood Violet.

Ionone, 10 minims; extract of violet, 18 ounces; extract of cassie, 4 fluid ounces; extract of jasmin, 4 fluid ounces; tincture of orris, 10 fluid ounces; tincture of musk, 20 minims; otto of rose, 5 minims; glycerin, 30 minims.

MAKING AND FILLING SOFT GELATIN CAPSULES.

By FRANK EDEL, Des Moines, Ia.

Some months ago I noticed an article on laboratory notes in which the writer stated that his experience with the soft empty capsules of the market had not been favorable. The experience of this writer was so different from my own that I could but attribute his lack of success to nothing else than faulty manipulation in closing them. I have succeeded very well with this operation, but I always used extreme care not to get any oily substance on the edges of the capsules, closing them with a blunt glass rod containing a drop of the following gelatin mass:

Mass for Closing Capsules.

Gelatin	25 parts
Glycerin	10 parts
Sugar	8 parts
Water	45 parts

Soak the gelatin in the water, add the sugar and glycerin, then dissolve on a water bath.

When I first tried to do this work I did not succeed as well as later, owing to the fact that I used the gelatin solution too hot. I found from experiment that a temperature of 120° F. was about right, and never after had any more trouble on this score.

Later I took it into my head that it would not be a difficult matter to make the capsules myself, but for a time I could get no satisfactory molds. The first molds I used were made of wood, shellaced well to make them smooth. Subsequently, I secured molds made of tin (manufactured in Germany), and with these I had not the slightest difficulty, after a little practice, in making nice capsules in the winter time; in the summer I found, however, that it was necessary to have some means of hastening the hardening of the gelatin. To obviate this latter trouble I rigged up a rotary fan, working with a foot pedal, which worked satisfactorily.

The molds should be rubbed with a soft cloth holding enough olive oil so as to leave just a trace of oil on them, the rubbing being some distance up the supporting rod. The gelatin mass having been melted and of a temperature of about 110 degrees, the mold is dipped in and slowly withdrawn, and then rotated so as to distribute the gelatin coat evenly, and when it begins to harden set in a frame in a current of air. As soon as they have become sufficiently firm, the capsules are cautiously removed from the molds, and then the rough ends cut off by clipping with a pair of shears. The capsules may then be set aside in a suitable frame until perfectly cool, when they are ready to fill.

The mass given above works very nicely, but may be modified to suit individual preferences. If it is desired to make hard capsules, the glycerin must be omitted. I have found the following, recommended in a foreign exchange, very satisfactory:

Mass for Hard Capsules.

Gelatin	6 ounces
Acacia	1 ounce
Sugar	1 ounce
Water	5 ounces

Dissolve the acacia in the water, in this soften the gelatin, then add the sugar and heat on a water bath until solution is effected; remove any scum that arises, and use as directed for soft capsules. Hard capsules are not used as largely as they formerly were, the soft capsule taking preference, but they are made in the same manner. (West, Dr.)

TOOTH SOAP. formula of Frohmann ("Les nouv. Remedes"): Thymol 25, extract of rhatany 100, glycerin 600, magnesia 50, borax 400, spirit of peppermint 100, medicinal soap, sufficient to make 3,000 parts. The thymol and extract of rhatany are dissolved in the warmed glycerin and incorporated with the remaining ingredients.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Ellas H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblentz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Phar.D.
Wilber G. Compher, A. M., M. D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Phm.B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M.D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Jullus W. Sturmer, Ph.G.
	Fredrick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and DIPLOMAS are issued to all passing dual examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 61.

Inorganic Chemistry,

Secondary Group of Alkaline Earth Metals.—(Continued.)

COMPOUNDS OF CADMIUM.

The cadmium compounds resemble generally the corresponding compounds of zinc. They have a very limited use.

Oxygen Compounds.—Cadmium forms a brown oxid, CdO , produced when the metal burns or when the hydroxid is ignited sufficiently to expel water. The hydroxid, Cd(OH)_2 , is produced when a cadmium salt is precipitated with a caustic alkali.

The other principal compounds of cadmium are the chlorid, CdCl_2 ; iodid, CdI_2 ; nitrate, $\text{Cd(NO}_3)_2$; sulfate, CdSO_4 ; and sulfid, CdS . The iodid has been used to some extent in photography, and the sulfid, which is a bright yellow, as a pigment.

Characteristic Reactions.—Solutions of cadmium salts when treated with caustic alkalis yield white cadmium hydroxid Cd(OH)_2 , which, like the corresponding zinc compound, is soluble in excess of ammonia, but, unlike zinc hydroxid, is not soluble in excess of fixed alkali.

From either acid or alkaline mixtures hydrogen sulfid precipitates the bright yellow sulfid, resembling in appearance the sulfid of arsenic, but differing from the latter in not being soluble in solutions of the alkaline sulfids.

MERCURY.

Symbol Hg. Valence 1 and 2. Atomic Weight 199.8. Specific Gravity 13.59.

Historical.—Mercury has been known since several centuries before the Christian era. On account of its peculiar properties it has always been a substance of interest, and by the alchemists of the Middle Ages was thought to be an essential constituent of all metallic substances.

One of its modern synonyms, quicksilver, is a translation of the Latin *Argentum vivum*, literally, "living silver." The modern symbol Hg is from the Greek *hydrargyrum*, derived from *hudo*, water, and *argyros*, silver.

Natural Occurrence.—The element sometimes occurs in

the form of small globules disseminated through its ores, but is principally found as the natural sulfid in the red colored mineral cinnabar. This ore is found in moderate quantities in widely separated localities, in both the Eastern and Western continents. Mercury occurs in small quantities in amalgams of silver and gold, and as the native calomel.

Preparation.—Owing to the decomposibility of its compounds with oxygen and sulfur by heat, the extraction of mercury is a comparatively simple process, consisting merely in heating the ore in a closed furnace or in retorts, and condensing the volatilized metal in suitable chambers. It is further purified by redistillation.

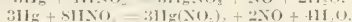
Description and Physical Properties.—At ordinary temperatures pure mercury is a lustrous white liquid, resembling molten lead in appearance. It solidifies at -38.8°C . and boils at 357° , though slightly volatile at all temperatures. The solidified metal resembles tin in appearance, and is both malleable and ductile. Commercial mercury commonly contains other metals as impurities, manifested by the "tails" formed by the globules when allowed to run down an inclined piece of glass. It can be freed from impurities by redistillation or by treating it in a thin layer with nitric acid, which dissolves the baser metals without attacking the mercury.

Owing to its high specific gravity, 13.59, all common metals, except gold, will float upon it. It alloys itself readily with many metals, forming amalgams, the consistence of which depends upon the relative proportions of mercury and the solid metal. Amalgams are extensively used in the arts and in dentistry.

Chemical Properties.—Pure mercury is not affected by oxygen at ordinary temperatures, but when impure from the presence of other metals or when finely divided slowly undergoes a superficial oxidation. Solutions of the alkaline chlorids in the presence of the atmosphere gradually form mercuric chlorid.

It is not attacked by hydrochloric or by dilute or cold sulfuric acid. Concentrated, hot sulfuric acid dissolves it with evolution of sulfur dioxide. Nitric acid, either

strong or dilute, dissolves it with evolution of nitric oxid, and the formation of mercurous nitrate if the metal be in excess, or of mercuric nitrate if the acid be in excess.

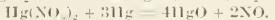
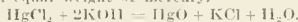


Uses.—Besides its large consumption in the manufacture of its compounds, the metal finds a large use in the manufacture of mirrors, thermometers, barometers and other objects, and is largely employed in the extraction of gold and silver from their ores, and in the production of amalgams.

When shaken or triturated with chalk, sugar or similar substances, mercury is "extinguished" or broken up into minute globules which do not coalesce again in the presence of the separating material. It is in this way that the gray powder, blue ointment and blue mass of pharmacy are prepared.

COMPOUNDS.

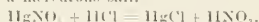
Oxygen Compounds.—With oxygen mercury forms two compounds corresponding to its different valences, mercurous oxid, Hg_2O , and mercuric oxid, HgO . Only the latter is of any considerable importance in medicine and pharmacy. It is prepared by adding a fixed alkali hydroxid to a mercuric salt, or by heating the nitrate with an equal weight of mercury.



Made by precipitation, mercuric oxid is an orange red powder. When made by heating the nitrate it is dark red and crystalline. The color of the latter depends upon its temperature. When heated it at first becomes bright vermilion red, and then black, returning to its original color when cooled. The oxid prepared by heating the nitrate is known as "red precipitate," and is made use of in ointments, and as the starting point for the preparation of some of the mercuric salts.

Corresponding to the two oxids there are two series of salts, the mercurous and mercuric. The former are generally more insoluble than the latter, and consequently less poisonous.

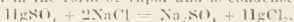
Halogen Compounds.—The two chlorids are *mercurous chlorid*, Hg_2Cl_2 , and *mercuric chlorid*, HgCl_2 . The first is usually seen as a white, impalpable, heavy powder. It is insoluble in water, and is prepared by adding a solution of hydrochloric acid or of any soluble chlorid to a solution of a mercurous salt.



Under the name of *calomel* mercurous chlorid is largely used in medicine as a hepatic stimulant. Treated with ammonia water it is converted to black dimercurous ammonium chlorid.



Mercuric Chlorid is commonly prepared by heating together mercuric sulfate and sodium chlorid. An interchange of bases takes place, and the mercuric chlorid passes off in the form of vapor and is condensed.



It is from this method of preparation and its corrosive properties that the salt has received its name of *corrosive sublimate*.

It usually occurs as heavy, white, translucent, crystalline crusts or masses, moderately soluble in water, alcohol and ether. It is a powerful corrosive poison.

Mercurous and Mercuric Bromids, Hg_2Br_2 and HgBr_2 , resemble the corresponding chlorids. They are of but little importance.

Mercurous Iodid, Hg_2I_2 , may be produced by triturating together mercury and iodine in the presence of alcohol, or by precipitating a solution of a mercurous salt with an iodid. It is a greenish yellow powder, which on exposure to light gradually changes into metallic mercury and mercuric iodid. It has some use in medicine.

Mercuric Iodid, HgI_2 , is commonly prepared by precipitating a mercuric salt with an iodid. The precipitate

at first is yellow, which as more of the iodid is added becomes orange red, and finally an intense scarlet.



If an excess of the iodid is added the scarlet precipitate dissolves to a colorless solution containing $(\text{KI})_2\text{HgI}_2$, known as Mayer's reagent, used as a reagent for precipitating alkaloids.

Salts of the Oxygen Acids.—Mercurous nitrate, Hg_2NO_3 , may be formed by dissolving the metal in cold, moderately dilute nitric acid. This is instable in solution, changing into insoluble basic mercurous and mercuric nitrate.

Mercuric Nitrate, $\text{Hg}(\text{NO}_3)_2$, is produced when mercury is dissolved in hot, concentrated nitric acid. For pharmaceutical purposes it is commonly prepared by dissolving mercuric oxid in nitric acid. The official solution is an acid, highly corrosive liquid, and is used as a caustic.

Mercurous Sulfate, Hg_2SO_4 , is formed by heating an excess of the metal with sulfuric acid. It is a dark, insoluble powder. If the acid be in excess, mercuric sulfate, HgSO_4 , is produced. It is a heavy, white, crystalline substance, decomposed by boiling water to the yellow basic salt, $\text{Hg}_2(\text{HgO})_2\text{SO}_4$, known as *turpeth mineral*, official under the title *Hydrargyri Subsulfas Flavus*.

Sulfur Compounds.—Mercuric sulfid, HgS , is found native as cinnabar, and may be artificially prepared either by triturating together mercury and sulfur, or by precipitating a mercuric salt with hydrogen sulfid. As made by these processes it is a black, amorphous powder. This when sublimed or treated with caustic alkalis is converted into a brilliant red powder known as vermilion, and used as a pigment.

Mercurous sulfid is not known. When a mercurous salt is treated with hydrogen sulfid a mixture of the metal and mercuric sulfid is thrown down.

Mercuric-ammonium Compounds.—A number of mercury compounds when brought into contact with ammonia form compounds with that substance. The most important of these are *dimercurous-ammonium chlorid*, $\text{NH}_4\text{Hg}_2\text{Cl}$, a black powder formed by treating precipitated calomel with ammonia water, and *mercuric-ammonium chlorid*, or *white precipitate*, NH_4HgCl , formed by pouring mercuric chlorid solution into ammonia water.

Characteristic Reactions.—Any compound of mercury in acid solution will deposit a film of metallic mercury upon a bright piece of copper. If the copper is dried and heated in a dry glass tube, globules of metallic mercury will be deposited on the sides of the tube. So also any dry compound of mercury heated in a glass tube with powdered sodium carbonate yields a sublimate of metallic mercury.

With stannous chlorid, in solution, all compounds of mercury are reduced to the metallic state. In the case of mercuric salts there is first the production of a mercurous salt, which then changes to a pulverulent deposit of mercury.

Mercurous compounds are distinguished by forming a white precipitate of mercurous chlorid when treated with hydrochloric acid or a soluble chlorid. This white precipitate turns to the black dimercurous-ammonium chlorid when treated with ammonia water.

Solutions of alkali iodids with mercurous salts yield a greenish yellow precipitate of mercurous iodid.

When a solution of an alkali iodid is added to a mercuric compound, a precipitate of mercuric iodid, HgI_2 , is produced, at first yellow, then changing to bright scarlet. The precipitate dissolves to a colorless solution with an excess of iodid.

Hydrogen sulfid passed into a solution of a mercuric salt yields a precipitate at first white, changing successively to yellow, brown, and finally black mercuric sulfid. This is insoluble in dilute nitric, soluble in nitro-hydrochloric acid.

PRACTICAL STUDIES.

1. Mix any solid cadmium compound with sodium carbonate and heat before the blow-pipe on charcoal. Note whether metallic globules are produced, and whether an incrustation appears on the charcoal.

2. Into a solution of a cadmium salt pass hydrogen sulfid. What is the appearance of the precipitate? Pour off the supernatant liquid and add yellow ammonium sulfid to the residue. Does the precipitate dissolve? From what other yellow sulfid does this reaction distinguish cadmium? (See Arsenic.)

3. Place a small globe of mercury in a tube, add moderately dilute nitric acid, and after the reaction has proceeded for some time, pour off the liquid and use in the following experiments:

4. Place a drop of the solution on a piece of copper foil, or on a copper coin, and rub with a dry cloth.

5. To another portion of the solution add a few drops of hydrochloric acid. What takes place? Write the equation.

6. Pour off the supernatant liquid from the last experiment, and add ammonia water to the residue. What is produced? Balance the equation,



7. To a solution of mercuric chlorid add, very gradually, solution of potassium iodid. Write an equation.

8. To the scarlet precipitate obtained in the last add more potassium iodid and shake the mixture. Write an equation.

9. Pass hydrogen sulfid into mercuric chlorid solution, and note the successive changes of color. Write an equation representing the final result.

10. To mercuric chlorid solution add solution of stannous chlorid very gradually, and with agitation. Note the change in color of the precipitate. Balance the equations,



LECTURE NO. 62.

The Pharmacist and his Assistant.

By ALBERT E. EBERT, Ph.M., Ph.D.

In the previous lectures much stress has been laid on the great importance of mastering the sciences that comprise and make up the art of pharmacy. In the present paper we will lay before the reader some features that relate to the mercantile side of the occupation. By those outside of the drug business it has been looked upon as a vocation equal to working a gold mine. However, to us on the inside it is known to compare unfavorably with most kinds of mercantile business, or with the so-called learned professions. As a trade it is limited in its scope, its wares being mostly required only in small quantities, the aggregate consequently making but a small business. In comparing it with the professions, it is usually considered as occupying a subordinate position, although the pharmacist's responsibility is as great as that of his co-laborer, the physician. Nevertheless, on account of the range of subjects being less than that of the medical science, his compensation is therefore inferior.

The small capital required makes the drug business an easy one for persons of limited means to enter; hence, the number engaged in it is much greater than the income from the business warrants. When a young man applies to enter the drug business and learn the art of the pharmacist, he, as well as his parents or guardians, should be made fully aware of the responsibilities it involves, and of the two-fold nature of the functions it requires to be performed, viz., those of a mechanical nature, acquired by manual practice, and those of a scientific character to be learned only by study in connection with practice. It should also be stated in clear and definite language that the illusions of great profits and becoming rich in the drug business that generally prevail are not real. Also he should be informed of the many menial services that will have to be performed and the long hours of attendance to business, or, in short, he should be told the whole, plain truth about the business, which none are more competent to give than those who are actually practically engaged in the drug business; thus, subsequent misunderstanding and dissatisfaction are avoided. It is a misfortune to many that the idea of the lucrativeness of the drug business has long since obtained popular credence, and often the fond parents, anxious that their boy should be started on the road to fortune, have unwittingly doomed him to an unhappy companionship with the pestle and mortar, when in the counting room of the merchant or the workshop of the mechanic he might have attained their desires.

If we have given this information and the applicant adheres to his request to acquire the practice and knowledge of the art and science of pharmacy, then it becomes our duty, as his preceptor, to instruct him fully in all that pertains to the vocation. We should first impress upon him the great importance of the three cardinal virtues; order, neatness and cleanliness, for these habits once fixed become a second nature, and are to a great extent the secret of success in business. We should not let him haphazardly perform any duty, without first showing him how to do it properly, e. g., the handling of the broom in sweeping, the duster in dusting, the use of the sponge and towel, the cleaning of the show windows and show cases. Explain the use of cleansing material, ammonia, alcohol, whiting, the proper way to clean paint, the wiping of the glass shelfware, the use of sawdust in removing oily drippings, the proper use of soap and alkalis. Acquaint him with the working tools of the art. Show him how to clean the mortars, graduates, spatulas. Explain to him the use of the proper mediums for this purpose, that of water, sawdust, paper waste, use of bath brick, pumice stone and cork for rubbing and brightening the spatulas, the use of bichromate of potash and sulphuric acid in removing organic matter from mortars and glass apparatus. In the cleansing of new bottles, shaking out the hay or straw prior to using water, explain why not to use hot water. Show him how to drain the bottles, then explain to him how to clean and to take care of bottles that have been in use. If they contained oily or resinous substances, show why turpentine, benzine, or an alkali, ammonia, soot or potash are used, and direct him to empty the rinsing into the "horse liniment" container, save the used corks, and place them in the drawer provided for such. Then explain the use of shot or chain in cleaning bottles. Then show him how to clean the metal as well as the glass of the show cases. Caution him against the use of too much water and too strong alkali. Demonstrate how to keep woodwork polished by rubbing over with a cloth containing a small quantity of kerosene oil, how accumulated dust from shelves may be removed with dampened sawdust and the shelves then cleaned with soap, water and a little ammonia. Insist upon the proper use and care of the sponge, chamois skin and towel. Instruct him once or twice a week how the shelfware or shelf bottles should be wiped; how with care each bottle should be handled, and that while doing this he should

read the labels and observe the physical appearance of the containers. Provide him with a book in which to note down from day to day such observations as impress him while performing his work of the store. Have him bring the book to you during the day or evening, or whenever the work of the store will permit, so that you may explain to him the subjects which he has noted, and has been unable to understand, and thus bring into play his faculties for inquiry and desire for information. Encourage him to ask questions, and abstain from ridicule if the questions seem silly.

When he has mastered the cleaning of the show windows, suggest to him that he arrange the articles of display, let him use his own judgment in such arrangement, and point out what may be faults of display. This will bring out his traits of observation in this direction, and if he has an eye for art and the beautiful it will evolve itself to your advantage, and thus relieve you from this work. Advance him by letting him arrange the goods in the show cases, and while handling the goods to acquaint himself with them; also note the cost and selling prices, so that he can at times when necessary aid you in showing goods to customers while you are busy at other work. Show him how to trim labels neatly, and impress on his mind how important it is that everything should be done with care and precision and if anything is worth doing, it is worth doing well.

Then teach him the system of weights for buying and selling. Mention to him that the weights we use in these transactions are those of the ordinary commercial standard and not those of the apothecary; erroneous impressions in this respect are frequently long retained, unless properly explained.

Show him how to handle and use the scales. Then let him aid you in weighing and putting up packages of drugs, like Epsom salts, sulphur, flaxseed, etc. Show him the proper way to wrap and tie the package. Impress upon him the importance of not too large a piece of paper, nor the excessive use of twine, as both interfere with forming a proper and neat package, besides the unnecessary waste of material. Show him how to tie a proper knot and to place the label on the package neatly.

Instruct him how to fold powder papers by letting him put up seidlitz powders. In doing this let him make use of the mortar and pestle in crushing the seidlitz mixture and the acid. Show him how to grasp the pestle, and how to properly rotate it in the mortar. It may be necessary to use the sieve in this operation; if so, show him how it is to be handled properly. This may have advanced him a step in the routine of learning the art, and each step properly shown and taught will have the tendency to interest and encourage the beginner.

How shall we familiarize him with the contents of the store, so far as relates to drugs, medicines and poisons? Not by reading the Pharmacopœia or dispensatories or any of the various works on pharmacy or materia medica, but by directing him to make note and study the articles that he comes daily in contact with. To ask for information of those around him, and for more particulars; to make note each day in his notebook of some article or articles that he has become familiar with by handling, and then when time allows during the day or evening consult the books of reference, by reading the description and information as recorded therein. By pursuing such a course systematically with each drug, he will soon have a fair knowledge of the contents of the store. When occasion permits, as he handles the containers, let him read aloud the official Latin names on the bottles, jars and drawers. Being usually abbreviated let him try and master the full name, e. g., acid, citric, acidum citricum; acid, oxalic, acidum oxalicum, pulv. myrrh, pulvis myrrhæ, pulv. camphor, pulvis camphoræ; rad. valerian, radix valerianæ; rad. tarax., radix taraxaci, etc. Explain to him that it is considered the

best Latin to pronounce the letter *a* as in arm; this is generally adopted by continental authorities.

Employ him in checking off and putting away, after you have inspected them, the goods from the wholesaler. Call his attention to the characteristics of the goods, their appearance, odor, color, quality, etc., also that he must see that they have correct weight or number as per invoice. Let him figure out the cost; place the cost price on them, and after footing up the bill, "O. K." it if correct. He will now soon become useful in waiting on customers, and he should be shown how to approach them, how to accost them, and impress on his mind the important rule that he constantly keep you informed what he may be doing, for too much care cannot be exercised in correctly understanding what customers ask for, and it is well to instruct him to repeat aloud what was asked for. He should be impressed with the importance that politeness is a very essential feature of success. However, this if told and not practiced by the employer will have little effect on the clerk. Good and pleasing habits acquired by practice become a second nature, and thus learned and fixed by discipline assist largely in business success.

If the business has any side lines, that of selling cigars, soda, etc., instruct him in each, as there are special knacks to each. Do not let him pick them up at random. About this time he should be called upon to make some of the more simple galenical preparations, e. g., simple solutions, like that of simple syrup. Then advance him by letting him prepare syrup of wild cherry. Let him reduce the bark to the proper fineness for percolation, and after due time has elapsed in maceration show him the *modus operandi* of packing it in the percolator, and explain to him the changes that have taken place in the generation of the active principles. Insist that he make a note in his memorandum book of the formula and process. And where the preparation is of that character that a stock bottle is kept, have him write out the working formula and directions for the process, and paste this on the back of the stock container, so that when the preparation is to be made again the formula is at hand without having to consult the authority, and again work out the formula.

When he has thus advanced and has proven himself somewhat competent and trustworthy, we should allow him to work in a larger field, and give him charge, with the proper supervision and the constant checking up of the work performed, of making the galenical preparations of the shop. He has now advanced from the apprentice to that of *repetarius*, which is the Latin term for one who restores the wantage. This term is used by the German and French and somewhat by our English confreres. However, we will be so bold as to coin a new word, and call him "laborist." This will be in line with proscriptionist, pharmacist, physiologist, chemist, druggist, etc. It may be more proper to say laborant, from the Latin *laboratorium*, yet we may just as well coin it from the English word labor, as take it from a dead language.

If the clerk shows any inclination to take up a hobby, like that of gathering insects, flowers, shells, butterflies, minerals, or a desire to make a collection of plants, encourage him to do it. It is better for you and for him than to have him playing cards, billiards, baseball, etc. These latter acquirements a drug clerk can easily spare in his make-up. Advise him to take up such studies as languages and mathematics and especial attention should be bestowed upon his handwriting, as this is very important to a pharmacist. Suggest to him subscribing to some of the publications of the profession and trade, and to become a student at a college of pharmacy and obtain the degree of Graduate in Pharmacy.

NOTE TO ERA STUDENTS.—No question blanks will be issued for this lecture.

PHARMACEUTICAL NOMENCLATURE.*

BY WILLIAM WEBER.

Pharmaceutical nomenclature is generally looked upon as being Latin, but this is only partially true. I remember having read an article on the subject by Prof. Oldberg years ago—at the close of the 80's or in the beginning of the 90's—of which, however, I only remember that alcohol and senna are Arabian words. Perhaps some of my colleagues may have to confess to the same condition of mind, and it may, therefore, not be without interest to once more come before them on the same subject, the more so as I intend to take a broader view of it.

Medicine is nearly as old as the human race, and so is part of it, the ingestion of plants and inorganic substances for the ills of mankind. Naturally it required ages before a sufficient knowledge of these various agents had been gained, and well may we ask how many lives may not have been destroyed through this empiricism? The heritage of the ages, I need scarcely say, has come to us through the Romans, Greeks, Arabs, and later on through the discovery of the new world called America, the explorations of it and of other regions of the earth previously less or little known.

When now with a critical eye we look at pharmaceutical nomenclature, we find that there is hardly any country of any importance which has not contributed to it more or less. In studying the history of the medical substances we also find that the Romans and Greeks were acquainted with and used a great many of these which we of to-day are still using. It must be borne in mind that the Greeks were the precursors of the Romans in learning, and that therefore the Greek nomenclature of medicinal substances is anterior to the Roman. And it is also a fact that we of to-day still call a number of them exactly as did either the Romans or the Greeks. A little survey will convince my readers.

For instance, *cantharis*—at least the Greeks used some kind of vesicating insect—*melissa*, *hyoscyamus*, *hydrargyrum*, *opium*, *glycyrrhiza*, *ammoniacum*, *crocus*, *manna*, *mastiche*, *stryax*, *aloe*, *cernua*, *cupri sulphas*, *galbanum*, *acacia*, *conium*, *lithargyrum*, *myrrha*, *gentiana*, *taraxacum*, *sulphur*, some kind of terebinthina, *tragaecantha*, *saccharum* were known and used by these ancient peoples. Purely Greek of the above are *cantharis*; *melissa*, which means the bee; *manna*, from Hebrew *man*; *mastiche*; others passed into Latin with their endings slightly altered, such as *hyoscyamus* from *hus*, hog and *kúamos*, bean, hog's bean; *hydrargyrum*, from *hydrargyros*, liquid silver; *opium*, from *opós*; *ammoniacum*, from the Greek, such as *glycyrrhiza* from *glúkús*, sweet, again from the Sanskrit, *garkara*; *conium*, from *koneion*; *galbanum*, from *chalbany*, and this again from the Hebrew, *chellbenah*. Or titles were formed by the Romans from the Greek, such as *glycyrrhiza* from *glúkús*, sweet and *rize*, root; *lithargyrum* from *lithos*, stone and *árgyros*, silver; *taraxacum*, from *táxis*, confusion.

In many instances it has been and is still our custom to form a title to a new substance from the Greek; thus we have *hematoxylon* from *haima*, blood, and *xulon*, wood; *creosotum* from *kréas*, meat, and *sozo*, preserve; or the synonym *calomelas* for *hydrargyrum chloridum* nite, from *kalós*, beautiful, and *mélas*, black; *bromine* from *brómos*, stench; *pepsin* from *pepsis*, digestion; *phosphorus* from *phos*, light and *phero*, carry; *iodum* from *íodes*, violet color; *antifebrin* from *anti*, against, and *febris*, fever; *antipyrinum* from *anti*, against, and *pyr*, fire; and many more of the modern remedies.

Arabian or due to Arabian influence are *cubeba* from *kababab*; *myrrha* from *mur*, bitter, or *murr* as I find in a new work just come to hand; *salep*; *senna* from a town in Portuguese East Africa; *alcohol*; *camphora* from *kafur*, Persian *kapur*; *saffron* from *safra*, yellow.

Other languages have made the following contributions: the Persian, *sumbul*; the Syrian, *aloe* from *alwai*; the Egyptian, *kami*, which passed to the Greeks as *kommí*, and to the English people as *gum*; the Hindustani, *chirata* from *chiraita*; *basamum* *gurjunee*; *jambul* from *syzygium jambolanum*; *tamarindus* from *tamr hindi*; *carechu*; *kamala*; the German probably *valeriana* from *baldrian*; the Italian *belladonna*; the Quichua, *rhathay* or *ratanhia*; the Japanese, *fructus sojæ*; but especially are the Spanish and Portuguese well represented. The endings in "a" remind us very much of the Latin, appear to be wholly Latin and tempt us to decline the word as we did "mensa" in our school days. Again these latter are mostly derived from native Indian appellations, which seem to bear a close resemblance to these two languages, and were consequently easily transmitted.

Thus we find in American and continental pharmaceutical nomenclature *copaiba* from aboriginal Brazilian *cupaiba*; *coca* from native name; *guarana*, Portuguese; *matico* and *sassafras* of Spanish and *guajac* of West Indian origin; *escarilla*, Spanish from *escasara*, rind; *vanilla*, Spanish diminutive from *vaina*, capsule; *sarsaparilla*, Spanish from *zarza*, thorny creeper, and *parra* or its diminutive *parilla*, a vine cultivated like a bower, and many others too numerous to mention.

As is easily seen, a number of these South and Central American Indian names are intractable to the Latin language, a fact which we can only deplore.

Since Africa has been opened to civilization and European cultivation, it is supplying not a few new drugs to the markets of the world; thus to only enumerate a few which go by their native names, *doumdake* from *sarcocephalus esculentus*, West Africa; *coltuna*, origin undetermined, West Africa; *majaho* from *carissa schimperii*, East Africa; *okahero*, origin undetermined, South Africa; finally the Polynesian we find in *kawakawa*, the Malayan in *betel*, *piper betel*, the Afghan in *delphinium zaili*.

Personal names are also hidden in a number of pharmaceutical titles, and they are very apt to appear like pure Latin. Such are for instance, *senega*, so named after the Seneca Indians; *grindelia*, *lobelia*, *krameria*, named after Grindel, Lobel, Kramer, botanists; *quassia* from the negro Quassi, *brayera* from Brayer, a French doctor living in Constantinople in the first decades of this century; and *cinchona* was named by Linné in honor of the Countess Chinchon, but not *colombo*, which is not the name of the Asiatic city, but is derived from *kalumb*, the East African appellation for the same.

So much for the origin of pharmaceutical nomenclature; however, it may be added that whatever in it has not come to us through the aforesaid sources, owes its origin to the so-called middle or new Latin or modern ideas of Latin.

Now to a few criticisms of pharmaceutical nomenclature. In the United States Pharmacopœia it is sought since 1880 to popularize Latin titles, while the common English names are only given in parenthesis. Such is the case in *absinthium*, *acacia*, *althæa*, *anthesis*, and a great number of others.

Now I ask, is it possible to popularize these so-called Latin synonyms and to expunge the English appellations from common usage? I doubt it very much. The project seems to me impracticable, and I would like to know very much if it has been a success.

A query which is worthy of attention is, when is a compound title to be formed of two nouns, and when of a noun and adjective? The United States Pharmacopœia and continental pharmaceutical nomenclature do not seem to be very consistent in this respect. Thus we have the following, with the following percentages: *Aqua chlori*, 0.4; *aqua camphoræ*, 0.8; *aqua anisi*, *aqua cinnamonomi*, *aqua feniculi*, 0.2; *aqua menthae piperite*, *aqua menthae viridis*, 0.2; *ceratum cetacei*, 10; *ceratum*

*Reprinted from Drug. Circ.

resinae, 35; charta nitrata, charta sinapisata, collodium cantharidatum, 60; elixir phosphori, 0.25; emplastrum opii, 6; emplastrum picis cantharidatis, 8; emplastrum resinae, 14; emplastrum saponis, 10; emulsio asafetidae, 4; emulsio chloroformi, 4; glyceritum acidi carbonici, 20; glyceritum acidi tannici, 20; glyceritum amyli, 10; linimentum saponis, 7; linimentum sinapis compositum, 3; liquor iodi compositus, 5; mel rose, 12; mistura ferri composita, 0.4; mucilago sassafras medullae, 20; mucilago tragacanthae, 6; mucilago ulmi, 6; oleatum veratrinae, 2; oleatum zinci, 5; unguentum acidi carbonici, 5; unguentum iodi, 4.

My conclusion from these specimens would be to form the title with a noun and an adjective where the percentage of the principal substance is small, but of two nouns where it is large.

Another and final point: On page xxv. of the present United States Pharmacopoeia we read as follows: "Nomenclature. In the choice of titles of official articles it is recommended that convenience, established custom and consideration of safety against mistakes through similarity or changes in names, should outweigh purely theoretical considerations or scientific preciseness." I ask, has this rule been obeyed in the case of the so-called Latinized English synonyms? Why is a very important change inaugurated for the public at large, which is often ignorant and not given to sudden and frequent changes?

When the rule was adopted that hereafter the name of a botanical drug should be its genus and not its species name, but where several species of the same genus were used, both genus and species named, why was the change not at once brought to a successful issue, as the druggist is supposed to be a man of learning, and therefore more pliable and adaptive to sudden changes? As the case now stands perhaps 50 per cent. of the botanical nomenclature of the United States Pharmacopoeia conforms to the standard, but not the rest. We have to only cite a few examples: *Artemisia absinthium* for absinthium; *artemisia paniculata* for santonica; *acacia senegal* for acacia; *acacia catechu* for catechu; *ferula fetida* for asafetida; *ferula sumbul* for sumbul; *dorema* for ammoniacum; *barosma* for badiu; *acorus* for calamus; *croton eluteria* for cascarrilla; *erythroxylon* for coca; *piper cubeba* for cubeba; *piper nigrum* for piper; *paullinia* for guarana; *cephelis* for ipecacuanha; *ipomoea* for jalapa; *piper angustifolium* for matio; *chondrodendron* for pareira, etc.

In this way also, as a glimpse at the foregoing list shows, we would eliminate a great number of the foreign appellations from the Pharmacopoeia and make it more what it is intended to be. Why was not the change carried out radically when it was decreed?

NOTE ON LIQUID PHOSPHORUS.*

By F. P. VENABLE and A. W. BELDEN.

In 1875 Houtton and Thompson¹ reported the formation of a peculiar modification of phosphorus formed on boiling ordinary phosphorus for five minutes with a strong solution of potash. The alkaline solution was poured off and the liquid phosphorus washed. It is said to remain liquid for months and solidifies only on cooling to -133°. It is further reported as not oxidizing in the air, nor giving off light in the dark. On becoming solid it forms ordinary wax-like phosphorus and a second variety of crystalline phosphorus.

These singular statements are cited in Dammer's "Handbuch der Anorganischen Chemie," and the chemical literature available to us has been searched in vain for any further mention of this strange variety of phosphorus. It has, therefore, seemed advisable to give a brief notice of some experiments in which it was attempted to form this liquid phosphorus.

Five grams of fresh wax phosphorus were placed in a

flask with 80 cc. of a saturated solution of potassium hydroxide and boiled for five minutes in a neutral atmosphere (nitrogen was used). This was washed with water at 19° and on the second washing the phosphorus solidified. If the alkaline solution was poured off directly, the phosphorus caught fire, hence it was usually poured off to small bulk, diluted with water, and again poured off and so on until the phosphorus was washed. In every experiment performed the phosphorus solidified after the second or third washing. The amount of phosphorus, the time of boiling (three, five, ten and fifteen minutes), and the strength of the potassium hydroxide solution (saturated to 10 per cent. solution), were each varied without securing the liquid phosphorus.

It is, however, true that the phosphorus becomes liquid on heating under the alkaline solution, and, if left covered with the same, stays liquid a long time, solidifying only when strongly cooled. It seems to give off occasional bubbles of gas during this standing and is probably being slowly changed into phosphine at ordinary temperatures. We are quite at a loss to know how the authors mentioned above secured their liquid phosphorus and how it could prove inalterable in the air. In all of our experiments it was peculiarly inflammable. (University of North Carolina.)

PRELIMINARY NOTE ON SOME NEW DERIVATIVES OF VANILLIN.*

By A. E. MENKE and W. B. BENTLEY.

When chlorine is allowed to act for some time on a solution of vanillin in chloroform, a white crystalline substance is formed which, after suitable purification and analysis, was found to be chlorvanillin, melting point 166 degrees.

If chlorvanillin in small quantities be treated with sodium amalgam, chlorvanillinol can be obtained, melting point 255 degrees. We have not yet succeeded in obtaining chlorvanillin alcohol. Fusion of chlorvanillin with caustic potash seems to yield chlorprotocatechuic acid, melting point about 235 degrees.

The action of dilute nitric acid in suitable proportion upon vanillin yields three products: a white substance containing nitrogen, almost insoluble in the usual solvents, melting point about 300 degrees; a yellow compound soluble in hot alcohol, almost insoluble in water, melting point 178 degrees to 179 degrees, and dinitrovanillinol, melting point 123 degrees, soluble in water. The substance melting at 178 degrees is either nitrovanillin or an addition compound of nitrovanillin and dinitrovanillinol, and by oxidation with permanganate forms nitrovanillic acid, melting point 214 degrees.

In an attempt to prepare chlorprotocatechuic acid directly from protocatechuic acid, we found that by passing chlorine in excess through an alcoholic solution of protocatechuic acid we obtained a resinous matter which yielded, upon treatment with caustic potash, a substance that could be precipitated by water. This body crystallizes well from alcohol in white crystals, melting point about 178 degrees. Analysis showed it to be tetrachlorprotocatechin. By varying the strength of the solution of protocatechuic acid, we obtained a different product. The fuller study of these compounds is in progress, and the complete results will be published in a later paper. (Arkansas Industrial University.)

Rothinghouse Bros., druggists of Gas City, Ind., received an almost illegible written order for "girsirl, hround, jalekseed" (as near as we can decipher it), and dispensed glycerin, hoarhound and flaxseed. They write, "Do not think we studied this out. The child who presented the order happened to remember the articles wanted."

*From the Journal of the American Chemical Society.

¹Arch. d. Pharm. (3), 6, 19.

*Journal American Chemical Society.

PHARMACY.

SANDALWOOD OIL PILLS: Sandalwood oil 5 gm. (75 grains), benzoin 5 gm. (75 grains), animal charcoal a sufficient quantity. Make into 40 pills. (Jour. de Ph.)

TOILET CREAM.—Boric acid, zinc oleate, of each 1 part, expressed oil of almond, lanolin, of each 2 parts. (Zeitsch. f. Kosm.)

LIQUID DEPLATORY.—Tincture of iodine 6 parts, oil of turpentine 6 parts, castor oil 8 parts, alcohol 48 parts, colloidion 100 parts. To be used once or twice daily for 3 to 4 days. (Ph. Post.)

AMINOFORM is a new name given by Lederer to Urotropin, or hexa-methylene tetramine. This is a compound resulting from the interaction of formaldehyde and ammonia, used as an antiseptic. (Ap. Ztg.)

LEUBE'S POWDER FOR CONSTIPATION.—This preparation, also known as Ewald's powder, consists of rhubarb 4 parts, sodium sulphate 2 parts, and sodium bicarbonate 1 part. (Ph. Post.)

RESTORATION OF DISCOLORED SYRUP OF FERROUS IODIDE.—Schwabe (Ph. Ztg.) recommends to restore the light green color by heating the syrup to boiling. The discoloration of this syrup is caused by the action of ammonia, derived from the air.

TROCHES FOR ANAEMIA.—The following formula is given in "Les nouv. Remèdes": Sodium bicarbonate, calcium phosphate, sodium chloride, sugar, of each 0.25 gm. (4 grains), reduced iron 0.2 gm. (3 grains), in each troche. Dose 4 to 6 daily. (Ap. Ztg.)

ALMOND MEAL SUBSTITUTE.—Mix 60 parts of expressed oil of almond with 120 parts of dried sodium carbonate and gradually incorporate the mixture with 2,000 parts of wheat flour. Perfume with benzaldehyde, oils of sandalwood and ylang-ylang. (Südd. Ap. Ztg.)

SALICYLIC ACID OINTMENT is used by Sterling in articular rheumatism instead of internal administration of sodium salicylate. He proposes the following formula: Salicylic acid, oil of turpentine, lanolin, of each 15 parts, and lard to make 100 parts. If the skin is affected by the application of this salve, the oil of turpentine should be omitted. This is to prevent eczema and irritation of the kidneys. (Ap. Ztg.)

DERMATOLOGICAL COCAINE PREPARATIONS, after Unna (Mon.-Heft f. pract. Derm.). 1. Cocaine dusting powder, prepared from 0.5 to 1 gm. of cocaine hydrochloride and 100 gm. of magnesium carbonate. 2. Cocaine ointment-soap, composed of 1 gm. of cocaine (free base) and 49 gm. of ointment-soap base. 3. Cocaine-Colloidion, consisting of 1 to 2 gm. cocaine (base), pyroxilin 1 gm., and ether-alcohol to make 50 gm. (Ph. Post.)

PREPARATION OF CONCENTRATED OZONE SOLUTIONS.—By introducing into solutions of quinine salts an ozonized current of air under ordinary or increased pressure, or by spraying solutions of quinine salts into gaseous ozone, concentrated solutions of ozone are obtained. Ozone is absorbed by solutions of quinine to a much greater extent than by water and the solutions so obtained are much more stable than ozonized water. (Chem. Ztg., through Ap. Ztg.)

DEODORIZATION OF POTATO STARCH.—According to a recent patent, the starch, suspended in water, is treated at 45° C. with chlorine, while the liquid is kept in motion by means of mechanical stirrers. It becomes entirely odorless and no longer emits the disagreeable dextrinlike odor when boiled with dilute sulphuric acid in the manufacture of glucose. The odor is said to be due to hydrocarbons in the ethereal oil of the potato, which are so changed by the action of chlorine as to make them inodorous. (Drog. Ztg.)

DISINFECTANT FOR SICK ROOMS.—Zinc sulphate 100 parts, sulphuric acid 5 to 10 parts, oil of mirbane 2 parts, indigo-blue 0.15 part. Of this mixture about 5 gm. are placed into the bed pan before using. It is very useful to deodorize the faces of patients who are confined to the bed, as it removes their odor completely and prevents decomposition, so as to make a microscopical examination possible the following day. The salt dissolves immediately in urine and in fluid stools, while solid faeces are disinfected by pouring over them a concentrated solution of the salt. (Ph. Post.)

PURO is a new meat juice, which differs from the other meat juices of the market in that it is made by expression of the meat and is not a solution of Liebig's beef extract. It contains 21 per cent. of unchanged albumin, other meat juices containing only 0.53, 0.63, and 2.83 per cent. Puro is stated to be a thrice concentrated sterile natural product, much superior in keeping qualities to the ordinary juices and extracts. The composition according to Fresenius is, in 100 parts: Water 36.6, organic matter 53.6, starch 9.3, albumin 21.3. (Südd. Ap. Ztg.)

IMPROVED MANUFACTURE OF WATER-PROOF FABRICS AND ROPES AND OTHER WATER-PROOF ARTICLES.—A. L. Kennedy, Philadelphia, has taken out an English patent (Jour. Soc. Chem. Ind.) by which small threads of pyroxilin, or acetate of cellulose are woven into fabrics and ropes, and the materials, when finished, are treated with solvents of these substances, so that they diffuse and impregnate the raw fibers and ordinary threads. In this manner the inventor claims to produce waterproof materials, which are not changed in structure or appearance, inasmuch as they are uncoated and unglazed.

SOLUTION OF SUBSTANCES IN THEIR OWN SOLUTIONS.—A. A. Noyes and W. R. Whitney claim to have experimentally established the law according to which solid substances are dissolved in their own solutions, and they express it in the following terms: "The rate at which a solid substance dissolves in its own solution is proportional to the difference between the concentration of that solution and the concentration of the saturated solution." This law has been proved to be correct in the case of substances so widely differing in chemical nature and physical properties as benzoic acid and lead chloride, and it is therefore assumed by the authors to be of general application. (Jour. Am. Chem. Soc., Sci. A.)

ASTHMA POWDERS FOR FUMIGATION.—(1) Lobelia, stramonium leaf, potassium nitrate, and black tea, of each equal parts. (2) Potassium nitrate 2 parts, anise seed 2 parts, and stramonium leaf 4 parts. The mixture is placed in a conical heap, the apex ignited and the vapors inhaled. (3) Mix 4 parts of potassium nitrate with 9 parts of water and add 6 parts of stramonium, 3 parts each of Indian hemp, lobelia, eucalyptus leaf, and tea, and 0.4 part of anise seed. Dry the mixture carefully and pass it through a fine sieve. (4) Cubebs, digitalis, of each 15 parts, jaborandi, grindelia, of each 30 parts, stramonium 60 parts, eucalyptus leaf 15 parts, potassium nitrate 45 parts, cascarrilla bark 4 parts. Mix and reduce to a fine powder. (Ph. Post.)

GLUE NOT AFFECTED BY WATER is made, according to Chem. Ztg., by mixing sodium, potassium, or calcium hydrate, sodium or potassium carbonate, silicate, borate or phosphate with albuminous substances as casein, albumen, blood, etc. When the mixture contains alkali in excess, it becomes after a time insoluble in water at ordinary temperature. When albuminous matter is in excess, the change takes place more slowly, but becomes rapid when the temperature is raised quickly. In using the latter preparation, the surfaces to be joined are covered with it, allowed to dry, and then pressed together between hot iron plates. (Drog. Ztg.)

TO SMOKERS. Generalarzt Dr. Scholer publishes in the *Centralblatt zu Gesundheitspflege* a collection of "Hints for Smokers," which are founded, as the doctor states, upon his professional observations for many years of the mouth, teeth, stomach, lungs, heart, and skin of the devotees of tobacco. The first and foremost rule is never to smoke before breakfast, nor, as a rule, when the stomach is empty. Never smoke during any exertion of great physical energy, as dancing, running, cycling, mountain climbing, or rowing, and especially if in a contest. Never follow "the bad custom of the French and the Russians" by allowing the smoke to pass through the nose; never inhale it through the nose. Keep the smoke as far as possible from the eyes and nose; the longer the pipe the better; the use of a short pipe during work is to be avoided. A pipe is the most wholesome form of smoking. Always throw away your cigar as soon as you have smoked four-fifths of it. The smoker should rinse his mouth with a glass of water in which a teaspoonful of table salt has been dissolved. It should be used as a gargle at night, and care should be taken that every cavity in the teeth is well washed with it."

CHEMICAL EFFECT OF CATHODE RAYS.—Some experiments on the chemical effect produced by the impact cathode rays, made by Professors Mommson and Skinner, are thus reported by London Nature (Jour. Franklin Inst.). "Aluminum is rapidly evaporated from the cathode by an electric discharge in a highly exhausted vacuum tube in which air has been replaced by mercury vapor. The metal is condensed over the walls of the tube in the form of a bright mirror. An iron cathode gives a similar mirror in a mercury vapor discharge tube. When the aluminum coating is dissolved off the wall of the bulb by hydrochloric acid a gelatinous membrane remains, which gives the reactions of silica. When potassium vapor is used the glass opposite the aluminum cathode is roughened. In parts sheltered by screens from the discharge the glass is not attacked. In potassium vapor the aluminum cathode is not evaporated to any marked degree. Opposite the cathode, both in the mercury vapor and potassium vapor bulbs, a dark annular stain of the shape of the cathode is formed. This stain resists the action of strong hot hydrochloric acid, nitric acid, aqua regia, and potash solution. The action of hydrochloric acid removed it, apparently by dissolving the glass. The tests indicate carbon, but the quantity of the stain is too small to make certain. The stain is also formed on screens of mica, quartz and calcite. Monatomic gases appear to permit the evaporation of aluminum, as Professor Callendar has observed its evaporation in an argon vacuum tube."

BACTERIA IN BUTTER. Conflicting statements have been made regarding the presence of tubercle bacilli in butter. While one investigator has found living tubercle bacilli in every one of 14 samples examined, another questions their presence in butter after examining 80 samples. Another states that reports of their presence are probably due to the resemblance of some other bacteria to the tubercle bacillus. Still another reports having found tubercle bacilli in 30 per cent. and

other bacteria resembling them in 60 per cent. of the samples tested. Hormann and Morgenroth have gone over the subject and reached the conclusion that butter contains true tubercle bacilli. In 3 samples out of 10 they were detected with absolute certainty, while 4 were doubtful. It is therefore a serious question of hygiene, whether butter, as usually made, should be admitted into the market and used. Such butter certainly does not meet the requirement that a wholesome food must be free from disease germs. Although we have as yet no proof of the transmission of tubercle bacilli from butter to man, there is every probability of danger, from the fact that infection from the milk of tuberculous cows has taken place. Therefore it is urgent that milk and cream designed for butter should be suitably treated. As a temperature of 70° C. (158° F.) is sufficient for the destruction of these bacteria, Pasteurizing would be the most practical. This is already used in the large dairies of Sweden and Norway. (Hyg. Rundschau, through Ap. Ztg.)

THE COLOR OF MERCURIUS IODIDE.—Maurice François (Jour. de Ph. et Ch.) gives the following directions for preparing a bright yellow iodide of mercury: Dissolve 125 gm. of mercurous nitrate in 2 liters of water containing 20 cc. of nitric acid. To the clear solution add from a burette slowly, with constant stirring, a solution of 50 gm. of potassium iodide in 100 cc. of water. Each drop gives a gray precipitate, which becomes yellow on stirring. When all the iodide is added, shake about 15 minutes longer to insure an intimate contact of the precipitate with the liquid. Let stand in a dark place, shaking 3 or 4 times during 24 hours. After this time the salt has the vivid yellow color of chrome-yellow. Wash in the dark by decantation, using about 10 successive portions of 2 liters of water and dry in a dark place at a moderate temperature. Washing with alcohol or ether is not advisable. The iodide so prepared is free from nitric acid, mercuric iodide, and metallic mercury and always remains pure yellow, refuting the generally accepted statement, that amorphous mercurous iodide has a greenish tint. The author has examined a number of commercial iodides of varying colors quantitatively, and found the greenish salts to contain uncombined mercury. This may be removed either by treatment with dilute nitric acid or by prolonged contact with a solution of potassium mercuric iodide (Mayer's solution). In the first case the metal is dissolved as mercuric nitrate; in the second it is converted into mercurous iodide. (Ap. Ztg.)

IDENTIFICATION OF ARTIFICIAL SILK.—P. Truchet (Ann. de Chim. Anal.; Jour. Soc. Chem. Ind.): Lustru-cellulose is distinguished from natural silk by the following reactions and properties:

1. The density of lustru-cellulose is 1.490, that of silk varying from 1.357 to 1.37.
2. When ignited, lustru-cellulose burns without the emission of any acid gases or smell.
3. When treated with Schweizer's reagent, lustru-cellulose and silk both swell considerably before dissolving. On the addition of water or hydrochloric acid, to the solution obtained from the lustru-cellulose, a white precipitate of cellulose is produced.
4. Lustru-cellulose dissolves in concentrated sulphuric acid with a deep yellow color, which, on the addition of diphenylamine, or of brucine, turns respectively dark blue or red. These color changes are very characteristic and are due to the presence in the fiber of nitro-cellulose which has escaped reduction by the compounds with which it has been treated. The test may be made without dissolving the fiber, the latter being simply immersed in a solution of diphenylamine sulphate, when it becomes colored dark blue, natural silk, when similarly treated, remaining colorless.
5. A simple test for lustru-cellulose consists in separat-

ing the fibers, moistening them with water, and determining their tenacity. The fibers of collodion silk when moistened have their outer coating dissolved and become very weak, while silk, whether moist or dry, withstands great tensile strain.

THE MANUFACTURE OF CODEINE.—The following is a literal translation from German official sources relating to a patent for the manufacture of codeine (Br. & Col. Dr.)—*Farbenfabriken v. F. Bayer & Co.*, etc. Process for the preparation of codeine. Addition to Patent No. 92,789, of July 9, 1896. Patented in the German Empire, April 13, 1897. Expires July 8, 1911. In Patent No. 92,789 a process for the preparation of codeine is described, depending on the action of diazomethane on morphine. It is now found that for the purpose of methylating the morphine it is unnecessary to isolate the diazomethane, but that one can carry out the formation of the diazomethane and the methylation of the morphine more advantageously in a single operation by adding the calculated quantity of nitrosomethylurethane to a solution of morphine, and slowly adding either an alcoholic or an aqueous solution of alkali. The reaction takes place in this way, that the alkali acts on the nitrosomethylurethane to produce diazomethane in the free state, which completes the reaction, in the nascent condition, with the morphine. The following quantities are used in the process: 285 grains of morphine and 132 grains of nitrosomethyl urethane are dissolved in 1,000 grains of methyl alcohol. To this solution one adds slowly a solution of 50 grams of KOH in 800 grams of methyl alcohol. When all the alkali is added, the alcohol is distilled off and the residue is extracted with benzene (C_6H_6). By evaporation of the benzene the codeine remains in a crystalline form. Instead of the alcoholic solution of KOH, one can employ an alcoholic solution of other alkalies, such as soda, ammonia, or organic bases, such as pyridine. Also, one can bring these bases into reaction in aqueous solution. Patent Specification: Alteration in process described for the preparation of codeine in Patent No. 92,789, consisting in the employment of nitroso-methyl-urethane, with the addition of bases, such as potash, soda, ammonia, pyridine, etc., to react with the morphine instead of the use of free diazomethane.

ANYTIN AND ANYTOLS.—Through the action of sulphuric acid on mineral or rosin oils, etc., sulphonic acid derivatives are formed, which are soluble in water either as such or in form of their alkali salts. When these substances are treated with alcohol, a portion dissolves, and the residue is no longer soluble in water, but is again rendered soluble by addition of the alcoholic extract. It was surmised by Helmers, that these alcohol-soluble constituents might have the power of also rendering other insoluble substances soluble in water, and on experiment this was found to be the case. This body, which Helmers calls Anytin, is best prepared from sulphurated hydrocarbons, containing about 10 per cent. of sulphur in combination. Such hydrocarbons, treated with concentrated sulphuric acid, neutralized with ammonia and extracted with alcohol, give products that have the best solvent power. Anytin is, when perfectly dry, a brown-black, very hygroscopic powder, containing 16.5 per cent. of sulphur and 4.5 per cent. of ammonia. It is precipitated from its aqueous solution by alkalies, the precipitate being soluble in pure water. Salts of the alkaline earths and of most metals give precipitates insoluble in water. Strong acids separate the sulphonic acid as a gray-black mass. The substances that dissolve with comparative abundance in water in presence of anytin, include some hydrocarbons, phenols, cresols, ethereal oils and camphors. Iodine also is dissolved abundantly, but in this case chemical action also takes place. The substances mixed with sufficient anytin to render them soluble in water are called anytols. They

contain from 50 to 90 per cent. of anytin. Anytin is most suitable for preparing anytols when mixed with one-half its weight of water. Anytols have been prepared from cresols, cresote, guaiacol, benzol, eucalyptol, oils of peppermint, wintergreen, and turpentine, camphor and iodine. Anytin and meta-cresolanytol are good disinfectants and prevent coagulation of egg-albumen at a boiling temperature. (D. Med. Wochens., through *Ap. Ztg.*)

TREATMENT OF VANILLA BY CALCIUM CHLORIDE.—The object aimed at in the treatment of vanilla according to J. Soc. of Arts (Jour. Soc. Chem. Ind.) is to endow it with keeping properties, and at the same time develop the aroma which has not yet come into being at the time of cropping. Pods of the best quality should be perfectly smooth and without excrescence or holes. The longer the pods, and the more perfumed they are without acidity, the more valuable is the vanilla. On a well ventilated and properly exposed plantation the pods are ripe when the lower part begins to turn yellow. The calcium chloride treatment is as follows: On the day of cropping, or, at the latest, the following day, the pods are placed in tin cases, which should not be too large, as the subsequent heating must be as uniform as possible. These cases are fitted with lids closing on the outside of the box; they are lined with wool carefully arranged along the bottom and up the sides, and a little over the tops of the sides. The vanilla pods are placed on end, close enough to secure pressure without damage by rubbing, a horizontal layer is placed on top of these, the woollen cover is folded over all, and the lid put on. The tins are then put into the halves of wine barrels, and hot water emptied into the barrels up to the lids of the cases, care being taken that no water gets into the cases. The barrels are covered in order to prevent the cooling of the hot water. After standing overnight, the cases are taken out and the pods withdrawn, dried by exposure to air, and then kept for two or three days under woollen coverings in full sunlight. If the drying by hot water has been properly carried out, the coloring of the pods, after this latter operation, should be uniform. The further drying of the pods is carried out in boxes of galvanized iron with a hinged door, which closes on an india-rubber edging to insure air-tightness. Each box has 11 drawers or trays; the bottom and the sixth drawer are for the vessels containing calcium chloride, and the others for holding the vanilla. Eighteen kilos of calcium chloride are used for 45 kilos of vanilla. The trays should not be made of resinous or strong-smelling woods, as vanilla absorbs and retains odors it comes in contact with. The vessels for holding the calcium chloride are double-bottomed, the inner one being perforated to allow of the escape of the liquid chloride, and fresh calcium chloride is added when necessary. After the receptacles have been charged with calcium chloride and vanilla, the boxes are hermetically closed. The drying operation requires from 25 to 30 days, but the vanilla is examined every two or three days, and any pods showing moisture are taken out and put aside to be placed in the sun and prepared by themselves in a special box, where they are all collected. Vanilla insufficiently dried will not keep, and breeds small worms; vanilla overdried keeps well, but is not supple—it is called "broken," and has less commercial value. The drying is finished first on small frames, and then in tin boxes, traces of mildew being carefully wiped off the pods. The vanilla is then cleaned by agitation with water at 140° F., and is then lightly wiped and dried in the shade. Vanilla, after being packed, is always watched for at least a month before being sent away; the boxes are examined twice a week, and every pod showing the least sign of moisture is withdrawn. The mildewed pods are worked up by various processes, and sold as inferior vanilla.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Soda Water Formulas.

(F. F. G.) We are now compiling a new lot of soda formulas to appear in an early issue of the Era.

Measuring Spoon for Dispensing Ice Cream.

(M. Y.) A measuring spoon or device for dispensing a definite amount of ice cream at the soda fountain is known as the "Gem ice cream spoon," manufactured by George T. Butler & Co., Troy, N. Y.

To Give Ammonia Water a Green Color.

(M. C.) A writer in one of our exchanges says that water-soluble chlorophyll, as ordinarily found in the market, imparts a fine green to ammonia water. The permanence of the color, however, is a matter of doubt. He also states that a certain green-tinted ammonia solution of proprietary make deposits a portion of its coloring substance after a time, which would indicate that manufacturers who have given especial attention to the matter have not yet found a perfect means of coloration.

Sodium Borate, Zinc Sulphate and Morphine Sulphate.

(J. C. W.) asks criticism upon the following:

Zinc sulphate	3 grains
Morphine sulphate	1 grain
Sodium borate	2 grains
Camphor water,	
Water, of each	2 drams

Three drops in eye three times a day.

Borax is incompatible with both zinc and morphine sulphates, the former being thrown down as a white flocculent precipitate of zinc hydrate or borate and the latter as free morphine. The prescriber should be informed of the difficulty.

Formaldehyde.

(X. Y. Z.) There are but few subjects which have received more attention in the medical and pharmaceutical journals for the past two or three years than has formaldehyde. You will do well to consult the indexes of the Era for 1896 and 1897. Information upon the specific points you raise may be found in the following issues of last year: January 7, page 12; April 1, page 383; November 1, page 668; November 11, pages 717 and 735. The name "formalin" has been given to a 40 per cent. solution of formaldehyde in water. This product is manufactured by the Chemische Fabrik auf Actien, vormals E. Schering, Berlin, Germany. The American agents are Schering & Glatz, 55 Maiden Lane, this city, who will, upon request, doubtless be glad to send you literature upon the subject.

Cloudiness on the Inside of Glassware.

(J. B. W.) It is quite likely the "cloudiness" you describe as being on the inside of your cut glassware is due to a roughening of the glass by contact with the stems of the flowers when the wine glasses, decanter, etc., were used as flower vases. In other words, the glass was scratched and we know of no practical process which will restore it to its original polish. If the glass be not scratched or roughened, and be just "dull" or "smoky," it may probably be restored to a fairly bright condition by immersion in dilute hydrochloric acid and afterward rubbing it with moistened chalk or whiting. Almost any bottle may be cleaned of organic matter by

pouring into it or immersing it in a diluted solution of the "battery fluid" of the National Formulary, afterward washing the bottle with an alkaline solution, and subsequently rinsing with pure water.

Apothecaries in the Navy.

(J. W. G.) The apothecaries in the Navy are required to be enlisted men who are graduates in pharmacy and have passed an examination before a board composed of three medical officers of the navy. The scope of this examination is shown in Naval Regulations Circular No. 2, dated March 13, 1893, and may be obtained by addressing the Chief of the Bureau of Navigation, Navy Department, Washington. While the pay is \$60 per month, and there is hardly any chance for the apothecary's promotion, the chief complaint arises from the social features of the position. The term of enlistment is for three years. For an outline of the present status of the apothecary in the navy, see this journal, June 11 and 18, 1896, pages 740 and 771, respectively. Many other articles on the subject have been published in the Era during the past two years. Consult the indexes.

Champagne Cider.

(W. A. I.) Here are three formulas:

(1) To every 8 gallons of sweet, still cider, add 2 pints of strained honey or, in its absence, 2 pounds of loaf sugar, stir well, bung the cask and let stand for eight days. Add 5 fluid ounces of skimmed milk, or ½ ounce of dissolved isinglass, and immediately thereafter 2½ pints of diluted alcohol. Let stand for four days, bunging the cask up tightly.

(2) Good pale cider 100 gallons
Alcohol 3 gallons
Sugar, or honey 24 pounds

Mix them. If sugar be employed dissolve it in a part of the cider and add the solution to the remainder. Let the mixture stand during two weeks in a moderately cool place, taking care that fermentation does not begin. Finally, take out a few gallons, mix them intimately with a few gallons of skimmed milk and incorporate the mixture thoroughly with the contents of the cask. After clarification bottle the clear liquid and secure the corks. Keep the bottles on their sides or standing top down in a moderately cool place.

Tincture of Cimicifuga From the Fluid Extract.

(J. M. C.) writes: "To justify my position at the outset, I will say that I never make tinctures from fluid extracts except in cases of emergency. I made, a short time ago, a tincture of cimicifuga from a well known make of fluid extract according to the formula on the label. The result was a muddy tincture with a heavy precipitate; for experiment, I added a little water to the preparation, which cleared it. Am I not justified in believing that the fluid extract was not made according to the Pharmacopœia, but that it was made with a menstruum of some dilute alcohol?"

The menstruum used in making the fluid extract was probably different from that you employed as a diluent, else you would have had no precipitation. As a rule, we believe manufacturers aim to make their fluid extracts conform in strength to those of the Pharmacopœia, but just how closely they follow the details of the official process we cannot say. A very satisfactory tincture of cimicifuga may be prepared from the official fluid extract by simply diluting it with alcohol to the required drug strength. No precipitation occurs, as the same menstruum is employed in preparing the fluid extract. An official tincture of any drug can only be prepared by following strictly the directions of the Pharmacopœia, but in many instances practical preparations may be made from full strength fluid extracts by diluting them with the proper menstruum. You must know your fluid extracts, however.

Solutions for Electroplating.

(F. W. K.) This subject is a little outside the province of a pharmaceutical journal, and you can get better aid from those skilled in the art. Then, too, such works as Gore's "Art of Electro-Metallurgy," Napier's "Manual of Electro-Metallurgy," Wahl's "Galvano Plastic Manipulations," etc., containing definite directions for plating in gold, silver and other metals, you will find of much service. You will also find desirable information in regard to the matter in various technical receipt books, and we republish below some formulas for producing the necessary solutions for use with the battery.

Silver Plating Solutions.—For silver plating, the bath consists of potassium silver cyanide, prepared by precipitating solution of silver nitrate with potassium cyanide and dissolving the washed precipitate in excess of potassium cyanide solution.

- | | |
|------------------------------|-------------|
| (1.) Potassium cyanide | 12 ounces |
| Water | 1 gallon |
| Silver cyanide, about | 1 tr. ounce |

Filter and use in a porcelain or glass vessel. For the whitening bath dissolve one pound potassium cyanide in one gallon of water, add one-fourth of an ounce troy of silver cyanide and filter the solution. The baths are provided with silver feeding plates for anodes proportionate in size to the surface of the work to be plated. These are connected with the positive pole of the battery. The cleaned articles are connected by a copper wire with the zinc pole of the battery, dipped for a minute or two in the whitening bath, and when uniformly coated with a white film of silver, transferred to the plating bath under similar conditions. After the work is thoroughly cleaned and just before putting it into the bath, dip it momentarily in strong nitric acid or a mixture of equal parts nitric and sulphuric acids and rinse quickly. After this treatment it is sometimes dipped into dilute mercurous nitrate solution and rinsed again. This has the effect of coating the clean metal with a film of mercury, which secures a perfect adhesion of deposited silver.

Gold Plating Solutions.—In the process of electro-plating with gold the bath is usually heated, as the deposits obtained in such a bath are more homogeneous, tenacious and durable and of a better color, besides which recommendation a greater quantity of the metal may be deposited satisfactorily from it in a given time than from a cold bath. The same bath does not answer very well for all metals; either the bath must be modified to suit the metal, or the latter must be previously coated with another metal to suit the conditions. Gold deposits are obtained with the greatest facility upon silver or copper, their rich alloys or other metals coated with them. With these a hot bath (at about 170° F.) and a moderately strong current give good results.

- | | |
|----------------------------------|-------------|
| (1.) Distilled water | 1 gallon |
| Phosphate of soda, cryst. | 9½ ounces |
| Bisulphite of soda | 13-5 ounces |
| Cyanide of potassium, pure | 16 grain |
| Gold chloride | 160 grains |

Dissolve in a portion of the water, heated, the phosphate of soda. Dissolve in another portion of the water the bisulphite of soda and cyanide of potassium. Dissolve the gold chloride in the remaining water, stir the solution slowly into the cold phosphate of soda solution, and finally add the solution of cyanide and bisulphite. The bath, now ready for use, should be colorless.

- | | |
|---------------------------------|------------|
| (2.) Distilled water | 1 gallon |
| Ferrocyanide potassium | 5½ ounces |
| Carbonate potassium, pure | 13½ ounces |
| Sal ammoniac | 2½ ounce |
| Gold chloride | 28 ounce |

Dissolve all together, except the gold chloride, in the hot water; filter, cool and gradually stir in the gold chloride dissolved in a little water. Boil for half an hour, replace the evaporated water, and the bath is ready for use.

Honey and Almond Cream.

(J. W. C.) We cannot give you the formula for the proprietary article. One of the following may answer your purpose:

- | | |
|--------------------------|-----------|
| (1) Bitter almonds | 1 ounce |
| Yolk of egg | 1 ounce |
| Honey | 1 ounce |
| Oil sweet almonds | 2 ounces |
| Oil bergamot | 15 minims |
| Oil lemon | 12 minims |
| Oil cloves | 12 minims |

Bruse the almonds previously macerated in cold water and decorticated, and rub through a fine sieve; then add the essential oils and the mixture of the yolk of egg, honey and sweet almond oil, and heat the whole well until the ingredients have been thoroughly incorporated.

- | | |
|-----------------------------------|-----------|
| (2) Cold cream | 5 parts |
| Oil sweet almonds | 5 parts |
| Glycerin | 5 parts |
| Boric acid | 5 parts |
| Solution soda | 5 parts |
| Mucilage, quince seed (1:8) | 25 parts |
| Water | 143 parts |

Oil bitter almonds.

Oil rose, of each, q. s. to perfume.

Heat the cold cream, oil and soda solution together, stirring constantly until an emulsion is formed; then heat together the glycerin, boric acid, mucilage and water, mix with the emulsion, stir until cold and add enough water to make 200 parts; finally add the perfume.

- | | |
|-----------------------------------|---------------|
| (3) Sweet almonds, blanched | 8 av. ounces |
| Rose water | 32 fl. ounces |
| Alcohol | 4 fl. ounces |
| Oil of rose | 1 fl. dram |
| White wax | 240 grains |
| Spermaceti | 240 grains |
| White castile soap | 240 grains |

Shave the soap, place it in a vessel, add several ounces of rose water and heat on a water bath until dissolved. When the soap is dissolved, add the wax and spermaceti, continue the heat and stir occasionally. While this is going on, blanch the almonds, carefully excluding every damaged particle. Then beat them up in a scrupulously clean mortar, and allow the rose water to trickle into the mass by degrees. When the emulsion of almonds is finished, strain it without pressure, through clean-washed muslin. The previously prepared saponaceous mixture is now put in the mortar, and the emulsion carefully and gradually bleended with it. As the last of the emulsion is run into the mortar, the alcohol, in which the oil of rose has been dissolved, is made to follow it and mixed very gradually with the other ingredients. A too sudden addition of the alcohol frequently coagulates the milk and causes it to be curdled. As it is, the temperature of the mixture rises, and every means must be taken to keep it down. Finally, strain the product.

The almond residue may be washed with a few ounces of fresh rose water, to prevent any loss in bulk in the whole quantity. The newly formed milk should be allowed to stand at rest for 24 hours, when the clear portion may be drawn off the sediment, and is ready for bottling.

Preservation of Fruit Juices.

(W. A. I.) Express the juice of any fruit; filter and pour it into champagne bottles; fill them up to the head of the necks; cork tightly and fasten the corks down with cord or wire; then put the bottles into a kettle; set them on a double sheet of coarse paper, placed on the bottom of the kettle, and pack the bottles loosely in with hay or cloths; then fill the kettle up to the necks of the bottle with cold water; place over a moderate fire and let it boil for twenty minutes; then remove the kettle from the fire, allowing the bottles to remain in the kettle until the water becomes cold; then seal the corks and pack the bottles (sideways) in a cool, dry cellar. Prepared in this way they will keep in a perfect state for a very long time. Fruit pulps are pre-

served in precisely the same way, except that they have about an ounce of finely powdered sugar added for each bottle of pulp so put up.

De Brevans in "Manufacture of Liquors and Preserves," gives the following formulas: Juices of huckleberries, barberries, cherries and grapes.—Crush the fruit and pass the pulp through a horsehair sieve; crush the marc and unite and carry to the cellar. After 24 hours of fermentation filter and preserve. The juice of cherries is better when a mixture of black and red cherries is used.

Orange and lemon juices.—Remove skin and seeds, crush the pulp and press, and mix with rye straw, washed and cut fine, to assist the separation of the juice. Clarify by repose, filter and preserve.

Quince, apple and pear juice.—Peel and rasp the fruit, taking care not to touch the seeds. Press the pulp, mixed with rye straw, washed and cut fine. Clarify by repose, filter and preserve. The quinces should be fully ripe.

Raspberry juice.—Crush the fruit and press the marc. The liquid is allowed to repose for one or two days, after which it is filtered. One-fifth of the weight of red cherries is sometimes added to the raspberries.

Another process reported to have given excellent results is this one: The clarified juice is heated to boiling in a copper vessel and then poured into a dish. Meanwhile the bottles are provided with stoppers, and are then gradually filled, a space of about two centimeters in the neck being left empty; some alcohol is then poured upon the hot liquid, and the bottle is quickly stoppered, the cork being further secured as the liquid cools. The alcohol which evaporates into the empty space is sufficient for the preservation of the juice. The juice of fresh herbs may be preserved in the same manner. This process seems to be an entirely unobjectionable one. It is generally believed that many of the fruit juices as found in the market are usually preserved by means of antiseptics and anti-ferments, such as salicylic acid, boric acid, boroglyceride, sodium sulphite, peroxide of hydrogen, formaldehyde, etc., etc.

DRUG CLERKS FINED FOR SELLING POISONS IN VIOLATION OF THE PENAL CODE.

The "crusade" against the illegal selling of poisons by druggists, which the New York Morning Telegraph has been carrying on for the past two or three weeks, resulted on Wednesday, April 6, in the imposition by the Court of Special Sessions of a fine of \$25 upon one of the offending drug clerks.

The clerk so fined was Uriah B. Woolley, who is employed in the pharmacy of F. W. Schoonmaker, at Fourth avenue and Forty-second street. The reporter for the newspaper took the stand and testified that Mr. Woolley sold to him on March 17 last 30 grains of chloral hydrate without a prescription, without registering the sale in the poison register, and without placing a poison label on the bottle. In court Mr. Woolley was accompanied by his counsel, Mr. Hubbell, of the law firm of Hubbell & Baird, of 9 East Forty-second street. The only defense attempted was that in the pharmacy law chloral hydrate is classed in schedule B, among those poisons which are not required to be registered. The defendant said that he had not sold a killing dose and therefore thought that he had violated no law.

Justice Hayes, who presided, held that what constitutes a killing dose of any poison is merely a matter of conjecture. The case was evidently a novel one to the court and Justice Hayes consulted his associates, Justices Hinsdale and Jerome, several minutes before announcing his decision. He then said:

"You evidently and undoubtedly violated the law in selling the complainant the chloral hydrate. The court fines you \$25."

The punishment was made light because the defendant pleaded that this was the first offense on his part. Justice Jerome, in view of this fact, thought that a fine of \$10 would be sufficient, but Justices Hayes and Hinsdale held that \$25 was merely a nominal fine and quite small enough.

The prosecution was conducted by Assistant District Attorney O'Reilly, who told the court that he believed poisons were being sold promiscuously in violation of the Penal Code. Mr. O'Reilly pointed out that in the present case the poison had been sold without a prescription, without asking the name and address of the buyer, without registering it in the poison book and without conforming to the law to the extent of poison label on the bottle. He continued:

"This court is probably aware that if a person is detected in the act of carrying chloral hydrate, or 'knock-out drops' as the poison is commonly known, concealed on his person, he is guilty of a felony, the punishment for which may be made ten years' imprisonment. Chloral hydrate is one of the most insidious aids that thieves employ in the pursuit of their nefarious practices. Regarding this case which is now before the court I should like to call the attention of the court to the fact that the drug store where this poison was sold is directly opposite the Grand Central Station. That locality is well known as a rendezvous for pickpockets, thieves and confidence men. The mere fact that the defendant practically pleads guilty to this charge is sufficient to warrant a conviction. I think I do not need to say anything more."

The case against Drug Clerk Francis Couch, of Oscar Kalish's pharmacy, at Fourth avenue and Twenty-third street, was set for the same day. Owing to the sickness of the defendant it was postponed subject to the call of the court.

On Tuesday, April 5, the case against Druggist Frederick Engel, of the Olympia Pharmacy, at Forty-fifth street and Broadway, was called in the Jefferson Market Police Court, before Magistrate Poole. The druggist was represented by Attorney Flagg, who tried to impress upon the magistrate that the Penal Code was not the proper authority for the court to recognize, and asked for a dismissal of the complaint on that ground. The magistrate overruled the attorney's objection, and held the defendant for the Court of Special Sessions. Engel was charged with selling strychnine tablets to a reporter.

In the same court Frank Yager, proprietor of the drug store at 363 West 115th street, who sold strychnine to the reporter, it is claimed, in violation of the law, waived examination, and gave bonds in \$300 to appear in the Court of Special Sessions.

On Wednesday, Samuel Cohen, a drug clerk in the employ of Frederick Haas, at Twenty-first street and Fourth avenue, was tried in the Jefferson Market Police Court, and fined \$20 by Magistrate Poole. The charge against him was that of selling strychnine in violation of Section 402 of the Penal Code.

On Thursday afternoon, in Jefferson Market Police Court, Magistrate Poole imposed a fine of \$20 upon Benno Loefer, a drug clerk employed in Paul F. Metz's drug store, at Eighth avenue and Forty-second street. Loefer pleaded guilty to selling one dozen 1-grain morphine tablets without a prescription, without registering the sale, and without using a poison label. In admitting the sale, the clerk said that in his hurry he had mistaken the buyer for a physician of the neighborhood who was known to him by sight, and whose appearance resembled that of the reporter. At first the fine was made \$25, the court adding that he hoped it would teach the clerk a lesson. The attorney who represented the drug clerk pleaded with the justice to reduce the fine to \$20, and this was done.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, APRIL 21, 1898.

No. 16.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates: - - - \$3.00 per annum.
Foreign Countries in Postal Union, - - - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483,
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL..... 573	proprietary Association..... 593
Dr. Nuttalligh..... 573	Meets: Tom Fraser Ar- rested..... 593
Look Out for the Swin- dlers..... 576	Golden Chances for Our Merchants..... 594
ERA COURSE IN PHAR- MACY..... 577	Two Ancient Landmarks; Merchants' Association..... 596
Inorganic Chemistry..... 577	Charter Pharmacy Law Recognized; Drug Smug- gling Cases; Bowling Clubs to Meet..... 597
Elements of Pharmacog- nomy..... 579	Buyer Goes Abroad; Shorter Hours League Election; Pool Champion- ship of the Drug Trade..... 598
Favorite Fancy Fountain Beverages..... 583	NEWS LETTERS..... 596
Kola Preparations..... 584	BUSINESS RECORD..... 606
QUESTION BOX..... 587	Brooklyn College Com- mencement..... 608
PHARMACY..... 587	St. Louis College Com- mencement..... 609
Chalk..... 588	OBITUARY..... 610
Relations Between Job- ber and Retailer..... 588	Philadelphia College Com- mencement..... 611
The Soda Fountain..... 589	STATE OF TRADE..... 613
Ideas for Retail Adver- tisers..... 590	MARKETS..... 614
Soda Water..... 592	
Package Dyes..... 592	
NEWS AND TRADE DE- PARTMENT..... 593	
Committees of the Pure Drug Congress; Execu- tive Committee of Pro-	

THE ERA DOSE BOOK.

Rapidity in prescription work is a recognized qualification in the dispenser, so much so that appliances and apparatus are continually sought for to facilitate speed. There is, however, another factor concerned in producing this desired result, viz., mental speed or quickness, and it also needs help in the way of labor-saving appliances. For instance, there are many things which cannot be trusted to memory without endangering accuracy, and the means for reference to these things should be just as handy and convenient as the other aids in dispensing. Nothing so well meets the requirement of mental speed in dispensing as the Era Dose Book. The most essential points in prescription work are condensed within it. The proper dosage of drugs and chemicals is indicated, and questions as to percentage, solubility, compatibility, dose equivalents, meanings of Latin, French and German terms, etc., etc., are answered at a glance. Whatever may be the other conveniences of the prescription department, there is need of a work of this kind and the Era Dose Book at 50 cents a copy supplies it most acceptably and economically.

Prizes For Era Students.

With very little noise, with no ostentation, the Era Course in Pharmacy has been pursuing the even tenor of its way since the beginning of the junior course in September last, and the students in the class are now nearly through the work of their first year, which terminates June 30. The success of this educational feature has been particularly gratifying to us, both because our conception of the need for such work has been thereby substantiated, and from the fact that we have been able to carry on the work with no interruption or hindrance and to a degree of excellence beyond our promises and expectations. This course in pharmacy has proven a more pretentious undertaking, more important in its results and interests, than its most sanguine promoters allowed themselves to anticipate. There have been enrolled in the class more than one thousand students, young men (and quite a fair sprinkling of young women, also), who otherwise, in all probability, would never have been able to secure a systematic and comprehensive education in pharmacy. These students have shown remarkable ambition and spirit of interest, and the work they have accomplished, as demonstrated in the character of quizzes and examinations that they have successfully undergone, is a token that they have been able to profit, and that to a most satisfactory degree, from the opportunities placed before them.

This Era Course in Pharmacy constitutes the most pretentious and important undertaking of the sort ever attempted and carried to successful execution. The lectures have been of a nature to warrant the highest commendations of teachers of pharmacy everywhere, and at the same time have been practical and effective in interesting the student and securing to him the necessary instruction and benefit. They may briefly and truthfully be characterized as both thorough and practical.

As indicated, the enthusiasm and interest of the students have been uniformly maintained, and we have all reason to expect that at the termination of the junior year, June 30 next, a very large proportion will be fully able to pass the examinations provided, and at a high rating. Conformable to several previous announcements, the director of the course and the editor and publishers of the Era, propose to recognize the merits of the students of this class, and will give a carefully selected list of valuable prizes to meritorious students. The exact details of the awards, how to be carried out, and what prize shall go to what student, and in what particular subject, cannot be announced at this writing, but must be delayed for full and particular statement until a later date. But we can in a general way outline the nature of these prize awards, and for this purpose a careful statement has been prepared and is published elsewhere in this issue. The attention of all students and subscribers and readers in general is directed to that page announcement of prizes for full and more explicit particulars.

We wish to take this occasion to publicly thank those of our friends who have shown their interest in the Era Course and in the students prosecuting it, by their liberal and voluntary contributions to the list of prizes. These prizes to their recipients will possess a value far greater than their monetary worth, though this latter is far from inconsiderable.

This Number.

There are a number of excellent features in this issue of the Era which we may be excused for singling out. The occasion is made one for the distribution of a much larger number of copies than customary, and all contributors, both to the advertising and text pages, have tried to do a little better than their best. Each of the regular departments has been amplified to the extent its space permits, and has received contributions of matter particularly appropriate to the occasion. The interview regarding the extension of American trade in foreign lands, and with particular reference to the drug business and its possibilities in Venezuela, will be read with interest, and we hope with profit, by all business men among our readers. In the contents of this number a special effort has been put forth to assist the pharmacist on the business side of his calling, and he is given advice by men experienced in each of the several lines of business activity. There are hints upon the selection and operation of the soda apparatus, upon the methods of retail druggists' advertising, upon the establishment and maintenance of desirable and proper relations between retailer and jobber and between the druggist and physician, a very timely collection of new and practical soda water formulas, and several papers upon interesting trade topics. A glance through a copy will be its best recommendation, and we feel confident that this little extra exertion on the part of all concerned will be appreciated by the Era's readers generally.

Dispensing Explosive Compounds.

The explosion which occurred in a West Side pharmacy in this city a short time since, and reported in our news columns, serves to call attention to the subject of dispensing possibly explosive mixtures and to the handling of explosive and inflammable substances in general. The subject should be one of great interest to pharmacists and incite them to careful study, for accidents of the character related are not so rare as many appear to think.

There is always an element of danger and a risk to the dispenser, and sometimes to the patient, in mixtures containing potassium chlorate. Few physicians seem to fully realize the ease with which it is deoxidized or decomposed, and they prescribe it indiscriminately with organic substances of all kinds. They give no thought to incompatibilities, and there are a few druggists who will attempt to compound almost anything, however dangerous it may be. Potassium chlorate should never be prescribed in powder, mixed with organic or inorganic combustible or oxidizable substances. The order of mixing, if a mixture must be made, should always be carefully considered, and the greatest caution observed. The ingredients should be separately powdered and mixed without pressure, a small quantity being dealt with at a time. It is here the laconic expression, "eternal vigilance is the price of liberty," should apply. Any combination of potassium chlorate with charcoal, catechu, sulphur, carbolic acid, salol, thymol, starch, sugar, saccharine, glycerine, sodium benzoate, salicylic acid, morphine, etc., is more or less prone to the production of an explosion. Potassium chlorate is not the only substance likely to cause trouble in

this respect. The bromates and iodates, potassium permanganate, bichromate, nitrate and picrate, picric acid, silver oxide and numerous others may be included in the same category. Chlorates are said to be among the most explosive compounds known, and they and their congeners should always be handled very gingerly. The dispenser's personal safety in this work is an equation he cannot afford to disregard.

The Sale of Poisons.

It is a question whether a person bent upon self-destruction can by any means be prevented from obtaining the materials or implements to accomplish his purpose, though it can be made very difficult. The most stringent of laws are of but partial service in this respect, as the determined individual can by hook or crook circumvent them. None the less, however, is there necessity for such laws and for the employment of the most effective obstacles to the purpose of the suicidally-inclined. Laws which to any degree will prevent crime and the misapplication and misuse through ignorance or carelessness of dangerous and harmful substances are and always have been considered wise and necessary. Therefore we have, to confine the discussion to but one phase, the laws regulating the sale of poisons by druggists. These laws, however faulty and ineffective, are good as far as they go. The question is, do they go far enough? Unquestionably, if fully lived up to, in spirit and letter, they would be more effective than they are, for there are without doubt numerous failures on the part of druggists to observe and enforce their provisions as intended. Still, as a rule they are well and honestly observed.

But are the poison laws strict enough? Does the dealer's responsibility end when he has registered and labeled as prescribed? The old question, am I my brother's keeper? must receive some consideration. Is there any way to confine absolutely the sale and application of poisons to competent, educated handlers, and make it impossible for the ordinary layman to secure them to be used at his irresponsible, ignorant, careless or wilful fancy?

This is a matter for wiser jurists to settle, but it is suggested by a tragedy which furnished a news item in this city last week. A young girl borrowed a glass tumbler, had it filled at a drug store with carbolic acid, which she represented was to be used for household purposes, and, after leaving the store, drank the acid and died. The druggist is legally not responsible; he complied with all the requirements of the law, pasted a red poison label on the goblet, and all that, but a human life was sacrificed. The girl found it very easy to get the poison; a little lie was all that was necessary. Whose is the fault, whose the responsibility, for this state of affairs, and what is needed to make it better? It is a hard problem.

Liquorice Laws.

We are hardly able to credit this tale, which comes from Canada: "A Toronto druggist and his assistant were arraigned in police court for the crime of selling licorice to a boy on Sunday for a cold. In England and Canada, the name of this seductive and deadly drug is usually spelled 'liquorice.' Therefore, a druggist who sells it on Sunday is held to be guilty of selling liquor, in violation of the law, for the final syllable of the name is regarded as a mere frill, put on for ornament, and having no significance whatever. Some able jurists have questioned the validity of conviction under this interpretation, and have expressed doubts as to whether the Sunday liquor law of Canada can

be made to cover the sale of any solid substance merely because that substance happens to have a suspicious name." This must be a joke, of the English variety, don't you think so?

Internal Revenue Tax On Patent Medicines.

In case of war with Spain, the question of revenue taxes will be one of the interesting phases which the people of this country will soon have to face, and the revival of a tax on patent medicines is a feature of this possible legislation in which the drug trade will be most directly interested. There is some talk now in Washington of passing a law requiring a two cent stamp to be affixed to every preparation that sells for 25 cents or less, and a four cent stamp to all preparations the selling price of which is 50 cents or more. In England the stamp tax on patent medicines is, we believe, for one shilling preparations two pence; for two shilling preparations four pence, and for four shilling preparations six pence. In that country, too, it is the custom for the retailer to add the amount of the stamp to the retail price; e. g., a 25 cent preparation he sells for 27 cents, and in this matter it is clearly understood that "the consumer pays the tax."

It is fair to assume that the manufacturers and jobbers will not include the amount of these stamps in their price, and it is not right that the burden should fall upon the retailer, so that in self-protection the retail druggists ought to adopt the English custom from the very start, and not permit this tax to be taken out of their small margin. With the present low price of patent medicines there is no other way in which the retail druggist can protect himself.

Another interesting phase of this question is whether all the patent medicines in stock must be stamped in advance, or if the law will permit them to be stamped when retailed. If all the retail and wholesale druggists in the United States have to stamp their patent medicines, it will not only be a great task but a most severe burden, and if there is any possibility of such a regulation as this, druggists ought to use their influence with their members of Congress to prevent it. When the present tax was put on playing cards, we believe every dealer having cards in stock had to affix a stamp to each package of cards which he had in stock. What was a comparatively easy matter in the case of playing cards would be an endless task in the case of patent medicines, and a burden upon the retail druggists which they can ill afford at present.

If there should be a law passed putting this tax on patent medicines, the drug trade ought to try to improve the opportunity to bring the retail prices of these goods back to a figure that will afford them a reasonable profit. In almost every community, if the druggists went together and have a little better understanding among themselves as to the prices of patent medicines, it would be a comparatively easy problem, while raising these prices to cover the tax, to return to the full retail price, or at least put on a few cents more so as to give the retailer a legitimate profit. A little forethought and a better understanding in this matter on the part of the druggists will save them a great many thousands of dollars, and what threatens to be a hardship may possibly be turned into a genuine benefit.

A Directory of Swindlers.

Such a directory is published on another page of this issue. Manufacturers to the drug trade should paste this list up in plain sight, and refer to it whenever an order is received from a person or firm having no financial rating and not sending cash with order. It is incomplete, of course, but it includes the names of a number of pretty successful operators. With a view of making this directory more accurate and serviceable, we ask victims to send us the names of those who are entitled to a place upon it.

Two months free and a copy of the Era Price List are the inducements for subscribing to the ERA now. See announcement on another page.

DR. NUTTEIGH.

Fearful Warning to a Thoughtless Public.

St. Paul, Minn., April 15.—Once upon a time—no, that isn't it. Let us be exact or nothing. Thus: Several times—in fact, all the while—upon a time the prosperous town of Spongeville, Minnesota, boasted among its central attractions a thriving drug store, of which Dr. Nutteigh was proprietor, clerk, collector and every other old thing. Yes, old. For the doctor was old when he first struck the town; was old during the thirty years of his residence there, and was constantly made, by the peculiar character and habits of the people of Spongeville, to feel much older than he really was. A good man was the doctor. He paid his taxes; he went to church; he never voted but once on election days; he was everybody's friend and a good father and husband—especially meritorious in the latter capacity, for, though all his married life he was henpecked, the world never "got onto it" till after his death, which proves that he was also a diplomatist that could put even Talleyrand to the blush.

And Dr. Nutteigh was also a cheerful man. Never grumpy a minute. Never a cross or petulant word, however great the provocation. He wore a crown of thorns upon his hairless, benevolent pate, but the people of Spongeville were too blind to see it. He also carried a cross which stayed with him as persistently as did that pack to Bunyan's hero. It was not Mr. Bryan's cross of gold, either. It was of such curious texture that his neighbors and customers, though realizing it was a cross, couldn't for the life of them decide just what it was. Any one of those "close observers" so painfully and borefully in evidence just before election could have seen at a glance that the doctor's cross was merely an outgrowth of the take-all-and-give-nothing policy that found steady, systematic, consistent, enthusiastic advocates among the populace of Spongeville, and a patient, meek and inwardly bleeding victim in the person of the excellent doctor.

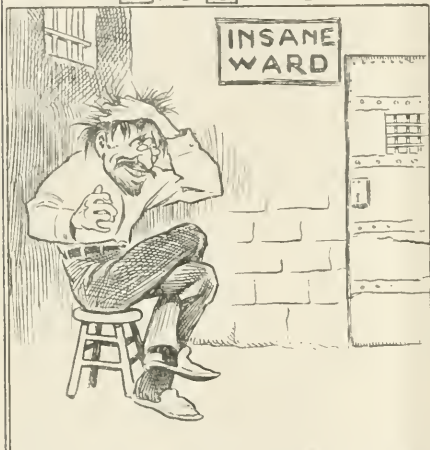
Let even the biggest and fattest porker gorge and guzzle no more than a human man, and with a little half a miracle, he is still able, should he chance now and then to open one lazy, drowsy peeper, to form some idea of a conspicuous object being flaunted before his facial bristles. And so it came to pass that Dr. Nutteigh's customers—and all the Spongeville folk were his customers—those tender-hearted, munificent cattle whose telephone, directory, messenger, postage-stamp and every other service didn't cost 'em a cent, thanks to the druggist's inexhaustible good nature—even Dr. Nutteigh's customers woke up to the fact that their guide, philosopher and friend was getting kind of queer. His disposition had always been sunny, and the darker grew the clouds of financial distress and popular and domestic persecution the sunnier that disposition. Poor fools! Little had they dreamed that every cheer-giving smile that played over that pale, drawn, deeply-lined countenance was a sturdy blow of self-defense. All these years had he been creating his only happiness by doing what he could to make others happy; to "push dem clouds away" from the sky of this or that poor devil that all the world was down on. He gave away his toys and candles to ragged little children whose home life meant just so much abuse, neglect and stunted rations every day. He drew upon his till to lend money to worthy unfortunates whose creditors were driving them to despair, and when the till was empty the doctor even went out and borrowed, that he might lend more.

Yes, he was getting kind of queer. But the doctor had always been queer. Queer—heretical, in fact—is any business man, who even for a moment throws his own interests to the winds and sacrifices himself and all he has in the service of somebody that needs sympathy but somehow never found it till then. How much queerer he who does it all the time! But the doctor was now queerer than ever. He became a reason for being, and finally made a miscue in putting up prescriptions, and the chance attention of the town's leading medical practitioner averted a tragedy. Then the Spongeville porker opened one lazy, drowsy peeper and saw something was up.

Within a week Spongeville had the profoundest sensation that had ever interrupted the digestion and rudely broken in upon the somnolence of this porker. One morning a casual passer-by heard a fearful commotion in the drug store. He heard the sharp sound of breaking glass and wrenching, tearing, rasping, splintering noises that betrayed the destruction of furniture and fixtures. The frightened man on the street alarmed the town and in a twinkling a great crowd had gathered at the drug store. There was Dr. Nutteigh in his shirt sleeves, the usual smile of disinterested kindness gone from his lips. The awful fire of dethroned reason flashing from his eyes—giving vent to mingled laughter and imprecation that paralyzed every on-looker with fear and horror. He had made as complete and thorough a wreck of the



The Cause



and the inevitable Result.

interior of that establishment as though King Cyclone had breathed upon it. And then, ten men had all they could do to floor and bind this feeble old apothecary.

The rest is soon told. The doctor did not long survive his commitment to the asylum. At times he raved, at times he seemed his wonted self. The end came peacefully at last, and that precious soul floated out upon the eternities as calmly and gloriously as the great red sun bids the world good night and sinks under the outer edge of summer's unrolled sea. These were his last whispered words: "Telephone? Why, certainly!"

The administrator of Dr. Nuttleigh's estate found the following entry in the doctor's books:

Gratuitous Services.

1. Postage stamps and furnish more paste.
2. Postal cards; furnish pen, ink, blotter, table and chair for correspondent.
3. Telephone. To teach its use; to telephone for parties.
4. Furnish change.
5. Cash bank checks.
6. Furnish blank bank checks.
7. Weigh mail.
8. Weigh meat and groceries to see if people have been cheated.
9. Receive mail for carriers.
10. Furnish postal rates to any part of the world.
11. Furnish directory. Find names and streets.
12. Furnish matches for the neighborhood.
13. Receive parcels, coats and umbrellas for safe keeping.
14. Send boy about neighborhood for people who telephone from down town.
15. Furnish time of arrival and departure of all trains.
16. Send laundry wagon to residences.
17. Send trunk express.
18. Get chimney-sweep for neighborhood.
19. Loan cord to the neighborhood.
20. Furnish to children empty cigar boxes, pictures and string.

JOHN TALMAN.

LOOK OUT FOR THE SWINDLERS.

At various times in the past few years, as occasion has demanded, The Pharmaceutical Era has exposed each individual member of the gang of thieves, swindlers, deadbeats and similar pests that infests New York City's business community and preys upon the drug and allied trades. In exposing these rascals detailed accounts of the operations of each have been given. Such operations, usually amounting to a fraudulent mail order business, constitute a story too familiar to need repetition at this time. But for the guidance of its readers, The Pharmaceutical Era again prints a directory of these swindlers and frauds, with whom it is unsafe to have any dealings whatever.

The following is a list of those who are now carrying on fraudulent businesses, (cheating merchants, manufacturers, etc., in the drug trade and other lines), and of those who have been doing so for the past three or four years, together with the various fictitious names, corporation titles, etc., employed by them for the deception of reputable traders:

- Behrens & Co., Stone and South William street.
 B. Blank, 29 Murray street.
 "Cohen & Co.," Hudson and Harrison streets.
 August F. Clark, (associated with A. Granville).
 "Clark & Co.," 52 Broad street.
 Henry P. Crosher, 163 Greenwich street.
 Rudolph P. Domschke, 101 Beekman street, and other addresses.
 Charles J. Dwyer, 119 Greenwich street, (with "Fraser & Co.").
 Eckmeyer & Co., 21 State street.
 Willard B. Ellison & Co., Hudson and Fulton streets. (Gerrish).
 Thomas E. Fraser, (alias Joseph Fraser), 119 Greenwich street.
 "Fraser & Co.," 119 Greenwich street.
 F. L. Gerrish, 440 Greenwich street, and other addresses.
 Algernon Granville, 171 Broadway, 82 Broad street and other addresses.
 W. J. Hazard, 108 Fulton street.
 P. B. Hudson, 108a Fulton street.
 Hunter Medicine Co. (Domschke).
 "Jesup & Co.," 108 Fulton street.
 C. Johnson, 125 Elm street.
 Henry Leonard (associated with A. Granville).
 John H. Masch, 102 Cedar street.
 Henry V. Meyers, 9th avenue and 34th street.
 — Oliver, 21 State street, associated with Cohen, Snyder, Seelig, et al.
 Perrine Drug Co., 41 Dey street, (Gerrish).
 Al. Rosenthal.
 William H. Sampson & Co., 15 Dey street, (Gerrish).
 F. L. Schenck, 35 Frankfort street.
 Schmidt & Co., 157 Cedar street. (Rosenthal & Jacobs).
 Louis M. Schnedig, 50 Vesey street, and other addresses.
 Henry Seelig, various addresses; associated with Snyder, Cohen, Oliver, et al.
 Joseph H. Snyder, 21 State street.
 William Stoothoff, 108 Fulton street.
 J. D. Turner, 410 Greenwich street.
 Vesey Import and Export Company, 62 Vesey street, (Gerrish).
 Sometimes, finding business in New York becoming slow, because of repeated exposures, some of the members of this gang go to some other city, usually near by, and start anew, trading on the name and reputation of some well known and solvent merchant in such city. The more recent of such swindling concerns and their manipulators were:
- "William McIntyre & Co.," 7 Walnut Street, Philadelphia (Granville and Leonard).
 "J. P. Clarke," 397 Broad street, Newark, N. J., (Granville and August F. Clark).
 "J. Martin & Co.," 22 Hudson avenue, Albany, N. Y. (Louis M. Schnedig and Al. Rosenthal).

The Era Price List is to be given free to subscribers to the ERA. See description of the Price List on another page.

Era Course students will be interested in the prizes described elsewhere in this issue.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Golebentz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Phar.D.
Wilbur G. Compher, A. M., M. D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Ph.M., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M.D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G.	William Simoa, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Stummer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in **THE PHARMACEUTICAL ERA**, and the **QUIZZES** and **EXAMINATIONS** are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years and **DIPLOMAS** are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and will end January 27, 1898; the second term will begin February 17, 1898, and end June 30, 1898. The Junior class for 1897 is now closed. **FEES.** The entire expense is only \$7.75 per annum and includes subscription to the Era, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 63.

Inorganic Chemistry,

Secondary Group of Alkali Metals.

COPPER. SILVER. GOLD.

According to the classification of the periodic system, these three metals constitute the secondary group of the family of the Alkali metals. The basis for this connection is found in the fact that they form a series of univalent halogen compounds, and also that certain of their compounds are isomorphous with the corresponding compounds of the alkalis. In their physical characters and in other respects, the characters of the two groups are quite dissimilar.

COPPER.

Symbol Cu. Valence 1 and 2. Atomic Weight 63.18. Specific Gravity 8.9.

Historical.—Owing to the fact that copper is of frequent occurrence in the metallic state, it has been known and used since prehistoric times. Prior to the discovery of the methods of extracting iron from its ores, copper was the chief metal used by primitive man in the construction of his tools, ornaments and weapons of war, though frequently confused with its alloys, brass and bronze.

One of the ancient names of the metal was "aes," or since it was largely brought from Cyprus, as "aes cyprium," gradually contracted to "cyprium," and at length changed to "cuprum," the later Latin name, from which we have the present symbol Cu, and by corruption the English word copper.

Natural Occurrence.—Besides its occurrence in the metallic state, disseminated through rocks, as in the Lake Superior region, where it is sometimes found in masses of a hundred tons or more, and in many other parts of the world, it also occurs in copper pyrites, as the basic carbonate, malachite, azurite, etc.

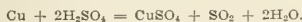
Preparation.—The method of extraction varies with the nature of the ore. If these are non-sulfur bearing they may be reduced by simple fusion with carbon. The sulfur bearing ores, i. e., the copper sulfides, are usually reduced by successive roastings and smeltings with fluxes or slag-forming materials, whereby the impurities are either gotten rid of as slags or driven off as gases, until the product known as blister copper, from its blistered appearance, caused by the escape of gases while in the molten condition, is left behind. The metal in this state is contaminated by the presence of cuprous oxid, which

renders it brittle. This is gotten rid of by "polling," or stirring the fused metal with a pole of green wood, the carbon of which occasions the reduction.

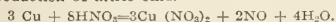
Other methods of reduction are by electrolysis, and by precipitating the copper from solutions of its salts by means of scrap iron.

Description and Physical Properties.—Copper is a tough, malleable and ductile metal, and an excellent conductor of heat and electricity. It possesses a brilliant luster, and a beautiful red color, seen more plainly where two surfaces are brought near together, as by doubling a sheet of copper until its sides nearly meet. It crystallizes in the form of octahedrons. Its specific gravity varies from 8.92 to 8.95, according to its freedom from air cavities. Its fusing point is 1054° C. Heated to just below its melting point it becomes sufficiently brittle to enable its being powdered. It expands on solidifying from the molten state, and hence is valuable for castings.

Chemical Properties.—Pure copper is probably unaffected in perfectly dry air, but in the presence of moisture and of substances which dissolve its compounds is rapidly corroded. Hence it is that substances containing organic acids, when in contact with copper are so quickly contaminated by that metal. It dissolves in the mineral acids, but without evolution of hydrogen. Hot, concentrated, sulfuric acid dissolves it with evolution of sulfur dioxide.



The best solvent is nitric acid, which dissolves it with the production of nitric oxid.



Uses.—Next to silver, copper is the best conductor of electricity, and hence is much used in the construction of electrical apparatus. Its toughness, ductility and malleability, in which qualities it is excelled by few metals, make it available for a wide range of application to the industrial arts.

Alloys.—Some of the alloys of copper have been known and used since the earliest times. Among the most useful of these are the brasses, or alloys of copper, with zinc in various proportions. Bronze, bell and gun metal are alloys of copper with tin. In general, the alloys are harder than copper, more fusible, and consequently better adapted to the manufacture of castings.

COMPOUNDS.

Two well marked classes of copper compounds are known, cuprous and cupric, in the first the metal having an apparent valence of one, and in the second of two.

From the specific gravity of the vapors of such of the cuprous compounds as have been volatilized, it has been thought that their molecules each contain two atoms of copper, so that many chemists write their formulas with two atoms in the molecule, or cuprous chlorid, Cu_2Cl_2 , and not CuCl , etc. The cuprous compounds are generally insoluble.

Hydrogen Compounds.—When a solution of copper sulfate is heated with hypophosphorous acid, a reddish brown precipitate of copper hydrid, Cu_2H_2 , is formed. It is instable and unimportant.

Halogen Compounds.—Copper combines with all of the halogens, with each of which it forms two classes of salts, except in the case of iodine, with which it is known to form only one, the cuprous iodid, CuI , or Cu_2I_2 . Cupric chlorid, CuCl_2 , and cupric bromid, CuBr_2 , are green, crystalline salts, which may be prepared by dissolving cupric acid or hydroxid in hydrochloric or hydrobromic acid.

Oxygen Compounds.—Copper is supposed to form four oxids, but of these only two need be mentioned. These are cuprous oxid, Cu_2O , and cupric oxid, CuO , corresponding to the two previously named series of copper salts.

Cuprous Oxid.—Is produced by reduction of cupric salts by certain organic substances, as grape sugar, when heated with them in alkaline solutions. It is of red or yellowish red color.

Cupric Oxid.—may be formed by heating metallic copper in a current of air, or by precipitating a cupric salt with a fixed alkali, and heating the product. It is a black, insoluble powder.

Salts of the Oxygen Acids.—Copper sulfate, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, also known as "blue stone" and "blue vitriol," has been known since the days of the alchemists. It may be obtained by dissolving scrap copper, or cupric hydroxid, in sulfuric acid and evaporating the solution to the crystallizing point. It forms transparent blue crystals belonging to the triclinic system. It has had some application in pharmacy and medicine, and is used to a considerable extent in agriculture and in the arts.

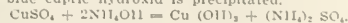
Cupric Nitrate.— $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$, is produced when copper or cupric acid or hydroxid is dissolved in nitric acid. It forms greenish blue crystals, containing three molecules of water, and by heat is decomposed into cupric oxid, nitrogen dioxid and water.

A normal cupric carbonate, CuCO_3 , is unknown, but a basic carbonate, $\text{Cu}(\text{OH})_2 \cdot \text{CuCO}_3$, is produced when a cupric salt is precipitated by an alkali carbonate. The green rust or "verdigris" formed on surfaces of copper when exposed to air and moisture has a similar composition. True verdigris is a basic acetate of copper.

Sulfur Compounds.—Two sulfids of copper are known. Cuprous sulfid, Cu_2S , occurs in nature as the mineral chalcocite, and can be produced by heating copper and sulfur together, or even by rubbing or pressing them together at ordinary temperatures.

Cupric Sulfid.— CuS , is produced when hydrogen sulfid or an alkaline sulfid in solution is added to a solution of cupric salt. It is a black, or brownish black, amorphous powder, oxidizing in moist air to form the sulfate. It is dissolved by nitric acid, and by concentrated hydrochloric acid, the first liberating free sulfur, and the second hydrogen sulfid.

Copper-Ammonium Compounds.—When ammonia water is added to a cupric salt just to the point of saturation, the deep blue cupric hydroxid is precipitated.



If added to supersaturation, the hydroxid redissolves to form an intense azure blue solution, in which the ammonia has apparently given up a part of its hydrogen for an equivalent of copper, as represented by the formula $(\text{N}_2\text{H}_5)_2\text{Cu} \cdot \text{O} \cdot (\text{NH}_4)_2\text{SO}_4$.



Characteristic Reactions.—Copper is characterized by a number of striking reactions, which enable it to be recognized in any of its combinations.

By zinc it is precipitated from solution in the form of a

dark red or brown powder. On iron it deposits as a bright red film of metallic copper. In both cases a corresponding proportion of the other metal passes into solution.

A borax bead saturated with a copper compound and heated in the flame, becomes greenish blue. If this be touched to a small granule of metallic tin and heated again, it becomes reddish brown from reduction of the copper.

Solutions containing copper color the non-luminous flame green, and in the presence of hydrochloric acid or a chlorid, the green is surrounded by a bluish mantle.

Ferrocyanids precipitate the bulky brownish-red cupric ferrocyanid, $\text{Cu}_2(\text{FeCy})_2$.

SILVER.

Symbol Ag. Valence 1. Atomic Weight 107.66. Specific Gravity 10.5.

Historical.—Like copper and some of the other metals which are either found native or are obtained from their ores by simple processes, silver has been known since before the earliest historical period. Its symbol is derived from the Latin name "argentum," which is related to the Greek "argyros." The modern English name is from the Anglo-Saxon "seolfor."

Natural Occurrence.—Metallic or virgin silver is of frequent occurrence in various parts of the world. Nuggets weighing nearly half a ton have been found in South America. The most important ores are the sulfids, either of silver alone, or of that metal in combination with copper, lead, antimony and other metals. It is also found to some extent as the chlorid or born silver, and as bromid and iodid.

Preparation.—The method of extraction employed depends upon the nature of the ore and the availability of fuel and water in the district where it is mined. One process consists in first forming an alloy by fusion with lead, the latter then being removed by oxidizing it in a current of air. Sometimes the metal is brought into solution and precipitated by the addition of other metals, as in the wet process of copper extraction. Another process is to extract the silver from the ground ore by amalgamation with mercury, and the latter metal being recovered by distillation.

Description and Physical Properties.—Silver is the whitest known metal, and when polished, of a very brilliant luster. It crystallizes in the form of regular octahedrons. It fuses at about 961°C , and can be vaporized by means of the oxyhydrogen blow-pipe, the vapor having a bright blue color. Melted silver has the property of absorbing large quantities of oxygen, which it gives off at the moment of solidification, producing the phenomenon known as "spitting." The specific gravity is 10.42 to 10.57. It is the best known conductor of heat and electricity. In ductility and malleability it stands next to gold.

Allotropic Forms of Silver.—Under certain circumstances, what appear to be allotropic forms of silver seem to exist, distinguished from ordinary silver by their solubility in water to yield deep colored solutions, and in the solid state having the appearance of burnished gold. The exact nature of these substances has not, however, been fully made out yet.

Chemical Properties.—Silver is not affected by oxygen or water, but is oxidized by ozone. It is readily attacked by sulfur or by substances containing it, or by sulfur compounds in the air becoming covered with a black coating of silver sulfid. Chlorine, bromine and iodine also combine with it. Hot, concentrated hydrochloric acid attacks it, forming the chlorid. By hot, concentrated sulfuric acid it is dissolved, forming silver sulfate, with evolution of sulfur dioxid. The best solvent is nitric acid, which unites with it in all concentrations and at all temperatures, with production of nitric acid as the by-product. In the powdered form it is sparingly soluble in ammonia water, but is not attacked by the fixed alkalies, and hence is adapted to the making of crucibles in which these are to be fused.

Silver is distinguished by forming a large number of insoluble salts than any other metal, nearly all of which are colorless, and are easily reduced by light or by organic substances.

Alloys.—Silver being too soft for use as coin or other articles subjected to wear, is hardened by alloying with

copper. United States coin is composed of 900 parts silver and 100 parts copper, or is "nine hundred fine."

PRACTICAL STUDIES.

1. Dip a piece of clean and bright iron or steel, as a knife blade, into a solution of copper sulfate slightly acidulated, dry and rub the deposit made. Assuming that iron was dissolved to take the place of the precipitated copper, represent the reaction by an equation.

2. Make a borax bead in the usual manner, dip into a solution of cupric sulfate and heat in the flame with the blow-pipe until clear. Note the color of the bead both while hot and when cool. Repeat the dipping and heating if the color is not distinct.

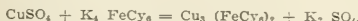
3. Using the bead just made, touch it to a small fragment of metallic tin or tin foil and heat in the inner flame of the lamp until the tin disappears.

Note the new appearance of the bead. Explain the change of color.

4. Dip a loop of platinum wire into a solution of cupric sulfate and carefully examine the change produced when the loop is held in the non-luminous flame. Repeat several times.

5. To the solution just used add a few drops of hydrochloric acid, and again test in the flame. Is there any change in the result?

6. To a solution of cupric sulfate add solution of potassium ferrocyanide. What occurs? Balance the equation—



7. To solution of cupric sulfate add a small amount of ammonia water and note the character of the precipitate produced. Next add sufficient to dissolve the precipitate and observe the color of the solution. What compound is probably produced?

LECTURE NO. 64.

The Elements of Pharmacognosy.

By PROF. L. E. SAYRE, B. Sc., Ph. M.

INTRODUCTORY.

With this issue we are pleased to present the first of two very excellent lectures on "The Elements of Pharmacognosy," by Prof. L. E. Sayre, of Kansas University. At our especial request the author has taken pains to make his treatment of the subject as free from technicality as possible, and to present an outline of study which may be followed intelligently by the most inexperienced student.

The student is earnestly advised to make use of the outline of the lectures in making an actual and critical study of the organic drugs at his command, and in order to increase his time for this purpose the customary question papers will be omitted for these two lectures, but the subject will receive consideration in the examination questions which are to be issued at the close of the present term.—J. H. Beal, Director.

Pharmacognosy Defined.—The literal meaning of this term, derived from the Greek, would indicate a rather comprehensive study of drugs. Literally translated the word signifies a knowledge of drugs. But this, like most of such general terms, is coming to have a definite and specific meaning, not suggested by its literal interpretation. There is some difference of opinion as to the full extent of the field pharmacognosy covers, but most writers agree that it should embrace among other things the study of the properties of those medicinal substances furnished by nature, excluding the products furnished by chemical processes. Some of the properties of drugs, however, are by common consent not included in the study of pharmacognosy. For example, physiological and therapeutical action. These are embraced in the department of pharmacology known as Therapeutics and Pharmacodynamics. Treatises on pharmacognosy, however, give a general history and description of the drug and its chemical constituents, following this not uncommonly by a concise statement of its physiological action and therapeutical application.

It would be quite difficult to give a very brief definition of Pharmacognosy, such as would include all that the term is understood to embrace to-day, but it will be sufficient for these lectures to say, that the primary object of Pharmacognosy, viewed from the pharmacist's standpoint, is to enable him to identify drugs, to estimate their quality, to detect their adulteration and to distinguish the characteristic elements of those which are allied.

Drug Classification.—In order to accomplish the study of pharmacognosy in a scientific manner, it is necessary to master one or several methods of drug classification. Here we bring to our aid botany, zoology, chemistry and numerous other branches of science. A classification based upon physical and structural characteristics and a classification based upon botanical relationship should be accompanied in the mind by still another, perhaps no less

important, a geographical classification. This latter may appear to have no striking significance from a practical point of view, but we have very high authority for saying it highly merits consideration in a scientific treatment of pharmacognosy. A pharmaceutically important plant is not satisfactorily represented unless we are informed regarding its habitat, its geographical distribution and of its cultivation. For the purpose of these lectures drug identification and recognition will be considered of superior importance, and special prominence will therefore be given to physical characteristics, but botanical and geographical origin at the same time occasionally will be noted.

Drug Identification.—In order to identify crude drugs it is necessary to cultivate the power and the habit of observation. This seems at first to be the easiest of mental operations, but we are taught by experience that it ranks among the most difficult. Scientific scrutiny and accurate perception of variable forms which constitute the physical characteristics of the various parts of plants furnishing drugs, and a precise reproduction of these characteristics in proper scientific terms, constitute a very important department of pharmacognosy, a department which is by no means, as yet, fully developed. Without the employment of brief, concise and accurate terms, such as are employed in the terminology of this department of science, drug description frequently would be very lengthy and often ambiguous. The student should be familiar with these terms, should

interpret and apply them according to the manner in which they are used by the pharmacognosist. For example, the terms "keeled" and "keel-less" are

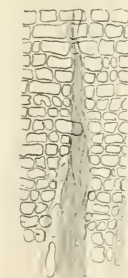


Fig. 1.—*Viburnum opulus*. Longitudinal section showing bast fibre.

applied to senega. These words carry with them a definite meaning in pharmacognosy, as will be found by referring to works describing this root. In order to identify a drug it requires more than a familiarity which comes to one from simply handling it as a merchant, although this kind of acquaintance is of much value. Oftentimes it requires more than a thorough knowledge of the gross characteristics, such as color, odor, taste and external form. Not infrequently a knowledge of the tissue, the cell forms and the cell contents is essential to distinguish between drugs of similar ex-



Fig. 2.—*Viburnum prunifolium*. Longitudinal section showing stone cells and bast fibre.

ternal properties; it is necessary, for example, to ascertain whether a certain form of hardened tissue known as stone cells is present, or whether, instead, the less hardened woody fiber only exists. This may be illustrated by Figures 1, 2, 3 and 4, representing under high power the microscopic appearance of longitudinal sections of the two barks (Fig. 1 and 2), and their appearance under still higher magnification when the barks are in the state of powder. (Figs. 3 and 4).

Ability to use the compound microscope in drug identification demands on the part of the student patient laboratory practice in that department of pharmacognosy known as Plant Anatomy. As these lectures are intended principally for the less advanced student in pharmacy, no practical details of this most fascinating work need here be presented. Drug identification, therefore, will be confined largely to the study of gross characteristics, such as may be perceived by the unaided eye and by the aid of the ordinary pocket lens. If the student provides himself with drug specimens and if he study carefully, first, those possessing striking physical characteristics, and then those less striking, he will find he can soon recognize with certainty a vast number by the form, color, odor and taste. For our present purpose, it is not necessary that each individual drug of the Pharmacopœia be described, but it is believed that it will be more profitable to make selections here and there such as will illustrate the many varieties of prominent forms or kinds of drugs. For the practical application of the

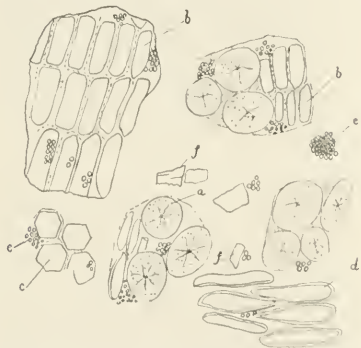


Fig. 3. Fragments of powdered viburnum prunifolium, x 400; a, stone-cells; b, inner bark cells; c, middle bark cells; d, inner cells of middle bark; e, starch grains; f, fragments of cork layer.

study as outlined, it is desirable to exhibit at the outset a classified list of the various kinds of drugs furnished by the vegetable and animal kingdoms. The following synopsis may serve such a purpose.

I.—VEGETABLE DRUGS.

A. DRUGS HAVING CELLULAR STRUCTURE.

- (a) Whole plants or some large portion of it—Leafy tops, Algae, Fungi and Lichens.
- (b) Parts of Plants—Individual organs or their parts—Roots, Underground Stems (Rhizomes, Tubers, Bulbs, etc), Twigs and Woods, Barks, Leaves and Leaflets, Flowers, Petals and Stigmas, Fruits, Seeds, Accessory parts or appendages.

B. DRUGS WITHOUT CELLULAR STRUCTURE.

- (a) Extractive substances—Extracts, concrete juices, expressed juices, etc.
- (b) Saccharine substances.
- (c) Mucilaginous substances.
- (d) Resinous Substances—Resins, Gum Resins, Oleo Resins, Balsams.
- (e) Oleaginous Substances—Volatile Oils, Fixed Oils, Fats, Waxes.

II.—ANIMAL DRUGS.

A. ANIMALS.

- (c) Insects.

B. ANIMAL TISSUES AND SECRETIONS.

Having this synopsis before us let us endeavor to follow the order it presents and name the official drugs under each group and its subdivisions. In the first group we have:

WHOLE PLANTS, LEAFY TOPS, ETC.

Herbs—Absinthium, chlrata, cannabls indica, chelidonium, eupatorium, grindelia, hedera, lobelia, marrubium, melissa, mentha piperita, mentha viridis, pulsatilla, scoparius, scutellaria, tanacetum.
Leafy Tops—Savin.
Algae—Chondrus.
Lichens—Cetraria.
Fungi—Ergot.

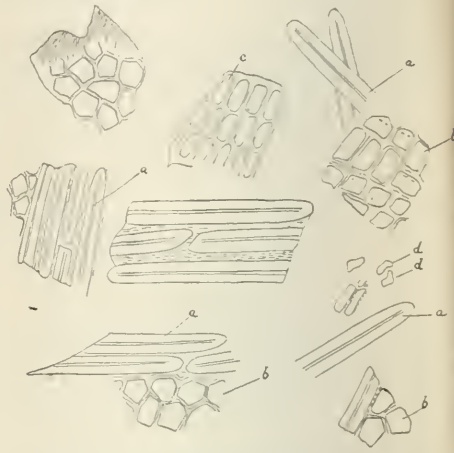


Fig. 4. Powdered viburnum opulus, x 400; a, bast fibres in bark, situated in middle bark; b, middle bark cells; c, outer layer of middle bark; d, fragments of cork layer.

General Characteristics of the 1st Group.—In this division of drugs there is one notable characteristic which any botanical student will recognize as important. We are supposed to have here all parts of the plant represented, and consequently it may be possible to identify the individual members by consulting a botanical key, but this is rendered difficult and sometimes impossible by the fact that many members of the group come to us in a very much broken and dried condition. Still, when an official herb is presented to a botanical student for recognition he at once asks the question: To what natural order of plants does this belong? By the aid of a pocket lens he can, after soaking them in water, examine fragments of stem, leaf and flower, and thus oftentimes decide from what natural order the plant is derived. Finally, by the same process, he may name the individual plant or drug. In the official herbs we have eight different natural orders represented, as follows: Ranunculaceæ, Papaveraceæ, Leguminosæ, Compositæ, Lobeliaceæ, Gentianaceæ, Labiatæ, and Urticaceæ.

An artificial key (that would include these orders and the official herbs belonging to them) might be constructed as follows:

I.—PETALS DISTINCT.

A.—Pistils, stamens and petals distinct, free from calyx or ovary. Herbs with perfect flowers and with divided, alternate leaves.... Order, Ranunculaceæ.

(a) Leaves three-erect, radiate with long, silky, hairy petiole, calyx petaloid, outer surface densely hairy..... Pulsatilla.

B.—Flowers 2-4 parted, ovary compound. Herbs with milky or colored juice.... Order, Papaveraceæ.

(a) Leaves long, pinnately lobed, capsules linear, one-celled, bitter and acrid.... Chelidonium.

C.—Stamens with their filaments united (monadelphous or diadelphous). Flowers papilionaceous, sometimes regular. Fruit a legume..... Order, Leguminosæ.

(a) Stems pentangular, dark greenish brown, usually bare of the small trifoliate leaves..... Scoparius.

II.—PETALS UNITED.

A.—Tube of calyx coherent with the ovary; the corolla apparently inserted in the ovary. Stamens united by their anthers and not by their filaments. Flowers in heads, furnished with an involucre..... Order, Compositæ.

(a) Heads small, pappus of capillary bristles.

- leaves connate-perfoliate, stem pubescent..... Eupatorium.
- (b) Herbs rather large, yellow, balsamic viscid, pappus three awns, leaves broadly spatulate or oblong..... Grindelia.
- (c) Pappus, 2-3 awns, heads small or medium, leaves spatulate or linear-oblong; less leafy than above..... Grindelia Squarrosa.
- (d) Pappus none or a short crown. receptacle convex, strong scented, flowers yellow..... Tanacetum.
- (e) Rays none, receptacle small, hairy..... Absinthium.
- 8.—Flowers not in heads, stamens 5, united by their anthers, sometimes also by their filaments..... Order, Lobellaceae.
- (a) Leaves alternate, ovate or oblong, stamens five; forming a tube, corolla pale blue..... Lobelia.
- C.—Herbage aromatic, stems square, leaves simple, opposite, flowers more or less irregular or bilabiate, didynamous or diandrous. Order, Labiate.
- (c) Inflorescence—terminal, spikes slender acute, leaves petiolate..... Mentha Viridis.
- (b) Spikes conical, obtuse, leaves sessile..... Mentha Piperita.
- (c) Flowers small, in axils of leaves, minutely pubescent, corolla long with narrow limb..... Hedeoma.
- (d) Hoary, woody, bitter-aromatic, leaves roundish, crenate, veiny, flowers in dense axillary whorls..... Scutellaria.
- (e) Bitter, but not aromatic, calyx lips entire, upper one with helmet-like projection..... Scutellaria.
- D.—Herbs with bitter juice. Flowers perfect and regular, calyx persistent, stamens inserted on the tube or base of corolla..... Order Gentianaceae.
- (a) Stem short, usually crushed sections, brown, woody, with large pith; flowers small, numerous..... Chlirata.

scale like, appressed; each having a shallow groove and a conspicuous depressed oil gland in the back; odor strong and balsamic. It abounds in essential oils.

Chondrus—Irish moss, thallus filiform; branched, yellow, horny, taste saline.

Cetraria—Iceland moss, foliaceous, with fringed lobes, brownish; the undersides white dotted.

Ergot—This important drug is not usually classified in text books as it should be—as a whole plant. The old idea that it is a product (diseased seed) of the cereal rye still clings to some pharmacologists, and they place the fungus under the natural order Gramineae, and speak of the drug as derived from a part of the plant (seed) of secale cereale, whereas the seed is simply the "host" upon which the fungus (*Claviceps purpurea*) grows. This fungus is collected when it has reached the second stage of its growth, at which time it is covered with a mass of mycelium threads compactly matted together. These threads can be seen under the microscope, if the ergot be softened by reagents, the threads teased or pulled apart by a needle, then mounted upon a microscopical glass slip. study of the development of ergot, by reference to a text book on pharmacognosy, will repay the student. He will then better appreciate what is said of the second stage (sclerotium stage) of this microscopic plant. Ergot, in shape, appears not unlike a cereal. It is narrow, oblong, purplish-black, odor and taste disagreeable and oily in character. The odor is so characteristic that when this is taken with the other characters mentioned, the recognition is unmistakable.

Following the order as outlined above, we now come to the consideration of that large group of drugs obtained from "parts of plants," or from individual organs. First in the group we have:

OFFICIAL & COMMON NAMES.	NATURAL ORDER.	BOTANICAL ORIGIN.	HABITAT.
Althæa (Marshmallow)	Malvaceæ	Althæa officinalis	Europe, Asia, U. S. and Australia.
Apocynum (Canadian Hemp)	Apocynaceæ	Apocynum cannabinum	United States.
Asclepias (Pleurisy Root)	Asclepiadaceæ	Asclepias tuberosa	United States.
Belladonna (Deadly Night Shade)	Solanaceæ	Atropa belladonna	Europe.
Bryonia (Bryony)	Cucurbitaceæ	Bryonia alba Bryonia diocea	Central and Southern Europe.
Calumha (Columbo)	Menispermaceæ (see also Pareira).	Gelsemium sempervirens	East Africa and Madagascar.
Gentianum (Yellow Jasmine)	Loganiaceæ	Gentiana lutea	So. United States.
Gentiana (Gentian)	Gentianeæ	Glycerhiza glabra	Mountain regions of Central Europe.
Glycerhiza Licorice Root)	Leguminosæ	lnula helenium	Southern Europe.
lnula (Elecampane)	Compositæ (see also Lappa, Pyrethrum and Taraxacum).	Jateorrhiza palmata	Central & So. Europe.
Ipecacuanha (Ipecac)	Rubiaceæ	Cephaelis Ipecacuanaha	Brazil.
Krameria (Rhatany)	Polygalææ	Krameria triandra and ixina	Peru and Bolivia.
Lappa, (Burdock)	Compositæ (see lnula)	Arctium lappa	Europe and Asia naturalized in U. S.
Pareira (Pareira Brava)	Menispermaceæ (see also Calumha)	Chondodendron tomentosum	Brazil.
Phytolacæa Radix (Poke Root)	Phytolacææ	Phytolacca decandra	No. America.
Pyrethrum (Pelittory)	Compositæ (see lnula)	Anacyclus pyrethrum	Mediterranean Basin.
Rheum (Rhubarb)	Polygonææ	Rheum officinale	Asia.
Rumex (Yellow Dock)	Polygonææ	Rumex crispus	Europe.
Sarsaparilla (Sarsaparilla)	Liliacææ	Polygala senega	Tropical America.
Senega (Seneka)	Polygalææ	Smilax medica & officinalis	United States.
Stillingia (Queen's Delight)	Euphorbiacææ	Stillingia sylvatica	U. S. from Va. to Fla.
Sumbul (Musk Root)	Umbellifereæ	Ferula Sumbul	N. & E. British India.
Taraxacum (Dandelion)	Compositæ (see lnula)	Taraxacum officinale	Europe and U. S.

III.—PETALS ABSENT.

- A.—Flowers small, greenish, monoecious, dioecious or polygamous, variously clustered, leaves simple, stipulate..... Order, Urticaceæ.
- (a) Leaves digitate of 5-7 linear, lanceolate, coarsely toothed leaflets, inner bark very tough, fibrous..... Cannabis.

The student is advised to employ the above synopsis in connection with some work on botany. This he should use in connection with a work on pharmacognosy, and especially with the drug in hand; trace out and verify the characteristics here exhibited. He should learn the definitions of the botanical terms used, and also commit to memory the full botanical names and the common names of the drugs. For this purpose it would be a great help to make out an alphabetical list, such as is presented below, under roots. To the above terms describing characteristics, the student should add others not herein included. He should carefully note those plants which are especially aromatic, bitter, acid or astringent, and as a help in this direction it might be well to make out a chart of Physical Characteristics, also suggested under roots. See below.

We have remaining in this first group:

Savin—From the natural order Conifereæ; leaves

ROOTS.

An alphabetical list of these, showing the botanical origin and habitat, is shown in the table above. When a natural order has more than one official root derived from it, it is indicated by cross reference. See Composite.

The above alphabetical arrangement, while it gives a list convenient for ready reference, is no help in identification. For this latter purpose the scheme below is presented:

ROOTS ARRANGED ACCORDING TO PROMINENT PHYSICAL PROPERTIES.

I.—THICKNESS OVER TWO-THIRDS OF AN INCH.

Light and spongy, transverse sections, odor musk-like; color brownish..... Sumbul.

Cylindrical, or longitudinal slices, yellowish brown; bitter..... Gentian.

Subcylindrical; bark brown gray, internally pinkish; wood yellowish; bitter and pungent..... Stillingia.

Grayish or yellowish, transverse or longitudinal slices; very fibrous and spongy..... Phytolacca.

Whitish or yellowish, transverse or longitudinal sections; pale orange brown bark..... Asclepias.

Whitish discs..... Bryonia.

Round or elliptical yellow discs with depressed center..... Calumha.

In segments, the cross-section marbled with red, white and yellow fiber ends; gritty; odor peculiar, aromatic..... Rheum.

Subcylindrical; wood bundles arranged in two or more distinct zones, separated by layers of parenchyma.....Parella.
 Deep rust-brown; compact and hard bark; scaly.....Krameria.

II.—THICKNESS USUALLY BETWEEN ONE-THIRD AND TWO-THIRDS OF AN INCH.

Cylindrical; brown with whitish bark arranged concentrically around a yellow woody center.....Taraxacum.
 Dark grayish brown; deeply fissured; compact.....Pyrethrum.
 Grayish transverse or longitudinal sections, with overlapping bark; bitter, camphoraceous taste.....Inula.
 Fusiform; grayish brown; sweetish, somewhat bitter.....Lappa.
 Somewhat tapering; color dirty grayish; fracture starchy; taste sweetish, afterward bitter.....Belladonna.
 Whitish, mealy pieces, showing projecting filaments at the edges and on the surface; odor faint, peculiar; sweetish.....Althea.
 Fusiform; brown or reddish brown; mucilaginous.....Rumex.
 Long, yellowish brown, cylindrical pieces internally tawny yellow; tough, pliable, fibrous, sweet and somewhat acid.....Glycyrrhiza.
 Light brown yellow, cylindrical sections; bitter.....Gelsemium.

III.—THICKNESS USUALLY UNDER ONE-THIRD OF AN INCH.

Cylindrical, very long; orange brown; white, horny wood, enclosing a pith.....Sarsaparilla.
 Light yellow to brown; a large knotty crown and a more or less prominent cork running one side of the roots.....Senega.
 Bark very thick, with annular rings interrupted by corky warts.....Ipecacuanha.
 Cylindrical; grayish, with yellowish wood, longitudinally wrinkled.....Apocynum.

Other tabular arrangements might suggest themselves as preferable for the purpose of exhibiting prominent characteristics, such as:

ROOTS ARRANGED ACCORDING TO (A.) TEXTURE, (B.) ODOR AND TASTE.

(For description of individual drugs see above).

A.—TEXTURE.

Woody—Glycyrrhiza, Ipecac, gelsemium, parella, krameria.

2. Fleishy—Althea, apocynum, asclepias, belladonna, radix, bryonia, calumba, celandine, lappa, physalocaca radix, pyrethrum, rheum, rumex, sarsaparilla, senega, stillingia, sumbul, taraxacum.

B.—ODOR AND TASTE.

1. Aromatic—Sumbul, gelsemium, inula.
 2. Acid—Senega, pyrethrum, stillingia, sarsaparilla, physalocaca, belladonna.
 3. Bitter—Gentian, bryonia, calumba, parella, rheum, Ipecac, apocynum, asclepias, rumex, taraxacum.
 4. Sweetish—Glycyrrhiza.
 5. Mucilaginous—Althea, lappa.
 6. Astringent—Krameria.

UNDERGROUND STEMS (Rhizomes, Tubers and Bulbs.)

Rhizomes are mainly distinguished from roots by the presence of scaly leaves or of sheathing leaf bases or their scars, which often give them an annulated appearance. Many of the rhizomes have rootlets attached to them, and the physical characteristics of these are to be distinguished as the individuals of the class treated above.

Tubers are enlarged fleshy subterranean stems or branches, and bulbs are also fleshy—a root made of layers or scales, as it were. The members of this group may be exhibited as follows:

SUBTERRANEAN STEM.

Rhizomes—Arnica Radix, Aspidium, Caulophyllum, Cimicifuga, Convallaria, Cypripedium, Geronium, Hydrastis, Iris, Lepidaria, Menispermum, Podophyllum, Sanguinaria, Serpentina, Spigelia, Trillium, Valeriana, Veratrum Viride, Zingiber.
 Tubers—Aconitum, Jalap.
 Corms—Colchic Radix.
 Bulbs—Allium, Scilla.

It will be impossible in the space limited to these lectures to tabulate the prominent characteristics of the individual members of this group. The student is strongly urged to make cut for him a scheme for their identification based upon the pattern suggested under Roots. Special attention and laboratory work should be given to the drugs of this group having conspicuous physical properties, such as: Cimicifuga, Hydrastis, Podophyllum, Serpentina, Spigelia, Valeriana, Veratrum Viride, Zingiber, Aconitum, Jalapa and Colchicum.

Some of these rhizomes have especial interest in the appearance of their cross sections, as for example:

Cimicifuga—The larger roots of this rhizome show a thick, cortical layer, enclosing a space which contains converging wedges of open, woody tissue, three to five in number, united in the shape of a Maltese cross or 'star.'

Hydrastis—Externally this drug presents a dull yellowish brown color, with numerous slender rootlets. Internally of a lemon yellow color, breaking with a short, resinous fracture. The wood wedges are narrow and radiate from a large pith.

Podophyllum—This rhizome consists of nodes and internodes, the internodes being about two inches long. The rhizome is much thickened at the nodes, where it is beset with from six to ten brittle rootlets below and a circular scar on the upper side. It breaks with a short, white and starchy fracture. The wood bundles are short and arranged in a loose circle about one-half of the distance from the center to the outside of the root.

Serpentina—This is a small contorted rhizome of a light grayish brown color, with numerous long, fibrous rootlets below. It resembles spigella in appearance, but may be distinguished by the characteristic, terebinthinate odor, and by the position of the pith, which in Serpentina is not in the center, but nearer the upper surface and in the projecting stem scars. Spigella has a dark or decayed pith and very slight odor.

Valeriana—This drug furnishes an example of an upright rhizome, obconical and beset with numerous small, brittle rootlets. Internally pale brownish; vascular bundles, small, forming a circle and enclosing a thick pith, nucleus sheath indistinct. Valeriana somewhat resembles veratrum viride, and is usually covered with long, yellowish brown rootlets. A cross section of this rhizome shows a whitish interior marked with dark colored dots and short lines, enclosed within the wavy nucleus sheath. Valeriana has a camphoraceous and characteristic odor.

Zingiber—This monocotyledonous rhizome presents a peculiar flattened surface, with large, club-shaped lobes on one side, deprived of the corky layers, leaving a pale, buff-colored surface, or may be covered with a white powder, fracture mealy, showing a whitish interior, dotted with small, orange-colored resin cells; aromatic and spicy.

Aconite, Jalap—These two drugs represent the official tubers. Aconite is produced at the end of a rhizome, about three-fourths of an inch thick at the crown, tapering below and almost napiform. Bark thick and internally grayish; cambium five or seven-rayed, enclosing the pith in the form of a star. Jalap is pear-shaped, hard and compact, externally grayish, with a dense circle of resin cells near the cambium; medullary rays small but plainly visible.

Colchicum—This is the only official drug represented under the head of corms. Externally it is of a brownish-gray color, wrinkled and with a groove on one side; often in transverse slices. Fracture short and mealy, showing numerous vascular bundles scattered through the parenchymatous tissue.

TWIGS AND WOODS.

The twigs used in medicine are the overground stems and branches of perennial, herbaceous or half shrubby plants, deprived of the leafy and floral appendages; they consist of a woody column, enclosing a pith and covered by the bark. The twigs of but one plant are now official; this is the bitter-sweet, or dulcamara. The woods consist mostly of hard vegetable tissue known as prosenchyma. These may be briefly described as follows:

I. WOODS.

Yellowish white chips or rasplings; intensely bitter.....Quassia.
 Greenish brown rasplings; resinous taste; slightly acid.....Guaiacum.
 Chips or coarse powder, purplish red; odorless and tasteless.....Santalum-Mrubrum.
 Chips or coarse powder, darker than preceding, and often with a greenish luster; astringent.....Hematoxylin.

To this group should be added the pith of sassafras, Sassafras Medulla. This is in white cylindrical pieces, very light and spongy, abounding in mucilage.

Notice to Era Students.—No question blanks will be issued for this lecture, but the subject will be considered in the questions issued on examination.

FAVORITE AND FANCY FOUNTAIN BEVERAGES.

Malt Phosphate Syrup.¹

Extract malt (syrup).....2 ounces
Vanilla syrup.....4 ounces
Oregat syrup.....4 ounces
Syrup.....8 ounces
Mix. To one ounce of this syrup in mineral glass, add one teaspoonful solution acid phosphates. Fill up glass with soda, coarse stream, stir with spoon and serve.

Orange Sherbel (Obbys's).¹

Vanilla syrup.....1 pint
Pineapple syrup.....1 pint
Orange syrup (from fresh fruit).....1 pint
Sherry wine.....4 ounces
Grape juice.....2 ounces
Dispense one and one-half ounces in mineral glass with crushed ice.

Tea Syrup.¹

Good black tea.....3 ounces
Boiling water.....1½ pints
Pour the boiling water on the tea in a porcelain or earthenware vessel, cover closely and infuse five minutes. Pour one pint of this infusion (adding more water if necessary to make up the measure), through a close straining cloth, without pressure. In this dissolve one and a half pounds of granulated sugar by agitation. For "Iced Tea" take one ounce of this syrup, one-quarter ounce fresh lemon syrup, two teaspoonfuls powdered sugar, two spoonfuls crushed ice, one slice lemon. Draw on soda with coarse stream, stir with spoon and serve in large glass.

Mountain Cream.²

Cream.....6 ounces
Red orange syrup.....5 ounces
Peach syrup.....1 ounce
Vanilla syrup.....10 ounces
Mix well. Use one ounce of this mixture, then draw one-half glass plain soda, then fine stream, quick dashes, until glass is full.

Cherry Bloom.²

Extract cherry.....6 drams
Extract strawberry.....2 drams
Extract vanilla.....1 ounce
Citric acid.....2 drams
Rock candy syrup.....1 gallon
Cochineal color to make red.
One and one-half ounces of this syrup to be used to each glass. The glass to be filled with crushed ice, and the soda water squirted in with a fine stream so as to thoroughly mix the syrup, and not to meet too much of the ice. Serve with straws. This is a delightful cooling drink for summer.

Leghorn Chocolate.²

Chocolate syrup.....1 ounce
Vanilla syrup.....1½ ounce
One egg
Piece of ice size of walnut
Shake well together, add plain soda, and pour from shaker to glass three times; top off with nutmeg.

Orange Phosphate.²

Select Messina oranges.....90
Oil of sweet orange (Sanderson's).....5 drams
Granulated sugar.....10 pounds
Genuine rock candy syrup.....7½ gallons
Grate the peel of the orange, being careful not to get any of the white spongy portion, which has a tendency to render the syrup somewhat bitter.

After carefully grating the oranges, mix them with the oil and ten pounds of sugar; beat them well in a large mortar for two hours, and put in a wide mouth jar and allow to macerate for forty-eight hours. Then add the rock candy syrup in its condensed form. Strain carefully through cheesecloth. Heat should not be employed. This syrup with a "dash" of phosphate will tickle the palate of the most fastidious.

Swiss Peach.²

Crushed peach pulp.....1 quart
Rock candy syrup.....3 quarts
Old peach brandy.....2 ounces
Gum foam.....1½ ounces
Mix well. Use one ounce to a mineral glass, with shaved ice and a little sweet cream; fine stream, then

coarse stream, to fill glass. Sprinkle with nutmeg and serve.

Coca Tonique.²

Wine of kola.....8 ounces
Wine of coca.....4 ounces
Blackberry brandy.....1 ounce
Lime juice.....1 ounce
Raspberry juice (made from fresh fruit).....8 ounces
Rock candy syrup.....8 ounces
Serve one ounce to a mineral glass, with a little ice.
Wine of kola is made from the fresh kola nut by percolating one ounce of it, ground, with ten ounces of sherry wine. Wine of coca is made by the same process as wine of kola, substituting the fresh coca leaves instead of the kola nut.

Sherbel.²

Rock candy syrup.....1 gallon
Raspberry juice.....6 ounces
Pineapple juice.....4 ounces
Cranberry juice.....4 ounces
Port wine.....3 ounces
Extract blood orange.....2 ounces
Fruit acid.....1 ounce
Extract vanilla.....2 ounces
Use either with or without ice cream. When used without cream add a few dashes acid phosphate when drawing.

Sarsaparilla Syrup.²

Sarsaparilla root cut.....8 ounces
Sassafras bark.....1 ounce
Macerate for 3 or 4 hours with one-half gallon of hot water; strain, dissolve in it 6 pounds of granulated sugar; then add:
Fluid extract licorice.....1 ounce
Essence wintergreen.....2 ounces

Red Orange Syrup.³

Extract of blood orange.....2 ounces
Improved liquid foam.....2 ounces
Blood orange coloring.....2 ounces
Simple syrup.....1 gallon
Mix thoroughly, then add:
Tropical fruit acid.....2 ounces
And strain.

Claret Syrup.³

Claret wine.....3 pints
Water.....1 pint
Fruit acid.....1 ounce
Granulated sugar.....6 pounds
Prepare by agitation or percolation.

Banana Syrup.²

Banana juice.....1 qt. bottle
Granulated sugar.....3 pounds
Mix, dissolve by heat, strain, and when cool, add:
Liquid foam.....1 ounce
Fruit acid.....1 ounce
Simple syrup.....4 pints
Violet Syrup.²
Extract of orris.....3 ounces
Extract of vanilla.....1 ounce
Liquid foam.....1 ounce
Vegetable green coloring.....1 dram
Simple syrup.....1 gallon
Mix and strain.

Mountain Pink Syrup.²

Extract of rose.....1½ ounces
Extract of orris.....2 ounces
Extract of vanilla.....1 ounce
Red fruit coloring.....1 ounce
Simple syrup.....1 gallon
Mix and strain.

Siberian Freeze.²

Cracked ice (fine).....1½ tumblerful
Claret syrup.....1 ounce
Lemon juice.....1 teaspoonful
Juice of.....1½ orange
Powdered sugar.....1
Plain soda.....1 tumblerful
Stir with twist bar spoon, and then add:
Pineapple.....1 slice
Peppermint.....1 sprig
Serve with straws.

Cyclers' Favorite.²

Cracked ice.....1½ tumblerful
Juice of.....1½ lemon
Lactart.....2 dashes
Cherry malt phosphate syrup.....2 ounces
Shake well, then add:
Plain soda.....1 tumblerful
Serve with two straws.

¹Smith & Painter's "Profitable Soda."

²Barker's "One Hundred Fountain Formulas."

³Chas. Lippincott & Co.'s Book of Instructions.

Nectone Syrup.²

Extract of vanilla.....	.2	ounces
Orange flower water.....	.2	ounces
Simple syrup.....	1	gallon
Red fruit coloring.....	1½	ounces

Mix and strain.

Foresti Flower Syrup.³

Anise water (freshly made).....	1	pint
Water.....	2	pints
Granulated sugar.....	4½	pounds

Dissolve by agitation or percolation, and add:

Syrup tolu, U. S. P.....	.2	pints
Extract of vanilla.....	.1	ounce
Red fruit coloring.....	.1	ounce
Liquid foam.....	.1	ounce

Mix and strain.

Sollero Syrup.³

Chautauqua grape juice.....	1	pint
Strawberry juice.....	1	pint
Granulated sugar.....	3	pounds

Mix, dissolve by heat, strain, and when cool add:

Elixir guarana.....	.4	ounces
Liquid foam.....	.1	ounce
Simple syrup.....	.4	pints

Mix thoroughly, then add:

Liquid phosphate.....	.1	ounce
-----------------------	----	-------

Tonic Syrup.³

Elixir callsaya.....	.1	pint
Compound infusion gentian.....	.1	ounce
Liquid foam.....	.1	ounce
Sugar coloring.....	1½	ounces
Simple syrup.....	.1	pints

Mix and strain.

Manhattan Cocktail.³

Cracked ice.....	¾	tumblerful
Cognac syrup.....	.1	ounce
Cherry malt phosphate syrup.....	.4	ounce
Extract of anise.....	.1	dash
Curacao cordial.....	.2	dashes
Plain soda.....	.4	ounces

Stir with a spoon and strain into a wine glass, into which has been previously placed a seedless cherry, then express the oil from a small piece of fresh lemon peel by twisting it between the thumbs and forefingers, immediately over the glass.

Pineapple Smash.³

Shaven ice.....	1-3	tumblerful
Pineapple juice.....	.1	dash
Pineapple syrup.....	1-3	ounces
Crushed pineapple.....	2	teaspoonfuls
Plain soda.....	.1	tumblerful

Stir with spoon, and then add:

Pineapple.....	.1	slice
----------------	----	-------

Scorcher's Delight.³

Shaven ice.....	¼	tumblerful
Liquid phosphate.....	.5	dashes
Comp. tincture of cardamom.....	.3	dashes
Vanilla syrup.....	.1½	ounces
Plain soda.....	.8	ounces

Stir, strain and serve with straws.

Mini Julep.³

Simple syrup.....	¼	ounce
Lemon juice.....	.1	dash
Shaven ice.....	½	tumblerful
Fresh mint (crushed against side of glass).....	.3	spries
Plain soda.....	.1	tumblerful

Stir and serve with two straws.

Imperial Cream.³

Cream soda syrup.....	.1	ounce
Extract vanilla.....	.1	dash
Pure cream.....	.1	ounce
Shaven ice.....	½	tumblerful
White of.....	.1	egg

Shake well, strain, then add:

Plain soda.....	.1	tumblerful
-----------------	----	------------

Serve with nutmeg.

KOLA PREPARATIONS.

L. Bernegea gives, in the *Pharmaceutische Zeitung*, (Nat. Dr.), the following formulæ for various kola preparations:

Kola Tablets.

Dry extract of kola.....	50	parts
Vanillin sugar (Vanillin, 1 part; sugar, 500 parts).....	35	parts
Chocolate powder.....	15	parts
Starch, sufficient.		

Mix and form into tablets of 15 grains each.

Kola-Peppermint Tablets.

Dry extract of kola.....	50	parts
Powdered sugar.....	49	parts
Oil of peppermint.....	1	part
Starch, sufficient.		

Proceed as before.

Kola and Citric Acid Tablets.

Dry extract of kola.....	50	parts
Vanillin sugar.....	45	parts
Citric acid.....	5	parts
Oil of lemon, 2 drops to every 100 tablets.		

Mix and proceed as before.

If pastilles are preferable, mucilage of acacia or tragacanth may be added, and the mass formed into pastilles in the usual way.

Kola Morsels.

Dry extract of kola.....	60	parts
White sugar, powdered.....	600	parts
Rosewater.....	150	parts

Mix and boil together and add

Sweet almonds, blanched.....	60	parts
Citron, preserved.....	60	parts
Orange peel, preserved.....	45	parts

Cut into fine pieces, and, if desired, color. After sufficient agitation to thoroughly mix the ingredients, pour the hot mass into suitable molds, which should be dampened beforehand. The mass may also be poured on a marble slab, let cool and cut into the desired sizes and shapes.

Kola-Malt Tablets.

Dry extract of kola.....	10	parts
Boiling water.....	10	parts
Dry extract of malt.....	30	parts

Dissolve the kola in the hot water, add the malt extract and evaporate (best in vacuo) down to 100 parts. In this preparation the excitant properties of kola are combined with the nutrient properties of malt. Iron may be advantageously combined with Kola-malt extract.

Kola-Pepsin Tablets.

Pepsin.....	10	parts
Acid hydrochloric, C. P.....	2	parts
Sugar of milk.....	35	parts
Dry extract of kola.....	50	parts
Starch, sufficient.		

Mix and compress into 100 tablets.

AUSTRALIAN PERFUMES.—Although the Australian colonies are rich in plants yielding delicate perfumes and valuable essential oils, little or nothing has been done. It is stated, to utilize the advantages thus afforded. Systematic flower farming is still in its experimental stages, and there exists an almost untouched field of great extent for those possessing the necessary capital and experience in the manufacture of perfumery and essential oils. In New South Wales the garden flowers of Europe and Asia, especially those emitting the richest fragrance, are found growing in unsurpassed luxuriance, many being obtainable nearly all the year round, whilst they are easily reared. Among the native perfume-yielding plants which remain unutilized are several varieties of acacia, including a few which furnish scented wood. The *Acacia farnesiana* grows plentifully in many parts of New South Wales, and another species of acacia, familiarly known as the "Golden Wattle," is equally useful as a perfume plant; as is also the native laurel, or mock orange. Among the plants from which sweet-scented and other oils may be obtained are the native sassafras, peppermint, bloodwood, blue gum, mountain ash, white gum, ironbark, woolly butt, spotted gum, tallow-wood, messmate, red gum, poplar, box, ridge myrtle, tea tree, native peppermint, dogwood and turmeric. The trees known by the various names are, of course, not always identical with those with which we usually associate the names in this country.—Colonies and India. (Pharm. Jour.)

HIOMOPIPERONAL, A NEW SUBSTITUTE FOR HELIOTROPIN.—Moureaux has obtained through the action of ethylene bromide on protocatechyl aldehyde a new aldehyde mixture, which is closely related chemically to the well-known and much used heliotropin, and is named by him as above. The product has an agreeable odor closely resembling that of heliotropin. It melts at 50 to 51° C., and separates from a solution in boiling water in form of light, white, silky crystals. Whether it can be placed on the market at a lower price than heliotropin is not yet known.—(Drog. Ztg.)

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XI.

NEW YORK, APRIL 28, 1898.

No. 17.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates: U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483, NEW YORK.
Cable Address: "ERA"—New York.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL	615
Aniline Colors in Germany.....	617
Monazite Sand of North Carolina	618
ERA COURSE IN PHARMACY	619
Inorganic Chemistry.....	619
Elements of Pharmacognosy	621
Ancient Drug Pots.....	625
From the Physician's Viewpoint	626
Cautchouc and Indiarubber Cements: Production of Ginseng in Korea.....	627
Some French Senators.....	628
PHARMACY	629
QUESTION BOX.....	631
NEWS AND TRADE DEPARTMENT	633
Another Duplicate Name Swindle: Death of Shorter Hours Bill	633
Swindler Caught at Last: Drug Trade Section Reviews Official Tares	634
Druggists at Last Victorious: Hard Rubber Companies Consolidated; May Know About the Murder; Carter Medicine Company Litigation.....	635
Philadelphia Commercial Museums	636
Chicago's Drug Trade.....	637
Paris Exposition	638
More Swindlers in the Toils; Druggist Convicted of Illegal Prescribing; Retires from Business; Druggists Object to Stamp Tax.....	639
Beginnings of Chewing Gum Business; "Swan Down" as Trademark.....	640
NEWS LETTERS	640
BUSINESS RECORD	647
Society of Chemical Industry; American Chemical Society; Association News	648
Kentucky and Ohio Pharmacy Laws	649
Chicago College Commencement	650
OBITUARY	652
PATENTS	652
STATE OF TRADE	653
MARKET REPORT	654

HAVE YOU ORDERED YOUR DIRECTORY?

The sixth edition of the Era Druggists' Directory is now in press, and copies will be ready for delivery within a few days. As the size of the edition to be printed is determined by the number of advance orders for the book, the supply over and above this number is necessarily limited by the probable demand. Those who have not already ordered will do well to do so at once. The new edition will show about 5,000 changes occurring in firms and locations of firms throughout the country, since the publication of the fifth edition a year ago, and firms who have considerable correspondence with the retail drug trade or send out advertising material, will find it a great economy, both in time and money, to possess the latest edition, with its corrected lists. The price of the book is \$5 per copy, delivered. Address D. O. Haynes & Co., Box 1483, New York.

The New Ohio Law.

We print on another page the full text of the new pharmacy law which has just received final enactment in Ohio. While it is in many respects a rather conservative measure, it is, nevertheless, much preferable to the one under which pharmacy affairs in that State have been conducted for many years past. It is remarkable for one thing, viz., that it passed without the change of a syllable from the time it was introduced and printed. The law as passed, however, is materially different from the one adopted by the State Association, printed in the Era of January 27, as, prior to its introduction into the Legislature it was found necessary to make numerous modifications in order to insure its success. Pharmacy bills as a rule are mutilated beyond recognition by their sponsors. The new Ohio law removes a number of abuses and inconsistencies against which the Board of Pharmacy has heretofore been obliged to struggle. It will make it easier to confine the business of pharmacy to properly qualified individuals, and to punish offenders against its regulations.

The law recognizes certificates from other boards of pharmacy in States which grant like recognition to holders of certificates from the Ohio Board. It requires re-registration every three years. There are also some important features in the section relating to prosecutions for violations of the law. The complaint is filed by the secretary of the board, and the prosecution is confided to the prosecuting attorney. All of the funds collected are paid to the treasurer of the board, and by him in turn paid monthly into the State treasury, where it is held as a fund for the use of the Ohio Board of Pharmacy.

There is cause for congratulation all around upon the enactment of this law. It is only wished that other States may be equally successful in their efforts. Kentucky did succeed this year, but Maryland was knocked out again.

A certain George Horning, of Philadelphia, was duly registered upon examination by the Pennsylvania Board of Pharmacy in 1893. It is now charged that he has several times since then appeared at examinations in New York and Baltimore, and, under an assumed name, passed the examination and secured certificates, which he sold at a good price. He is now under arrest on a charge of working this same racket upon the Pennsylvania Board at its last examination in Harrisburg. He admits that he impersonated Eugene Shirley, of Philadelphia, and that he took the examination in consideration of \$300 to be paid by Shirley. He has also confessed to taking an examination on April 16, 1896, for Alex. Loder, of Philadelphia, for the sum of \$100, of which he received only \$35. It would seem that the professional examiner-taker has a very lucrative business, if he is not rudely interfered with. Undoubtedly there are numerous instances similar to those noted, which have occurred in other States and remain undetected. The Pennsylvania Board will undoubtedly make an example of this enterprising individual, which should serve as a slight

deterrent to would-be imitators. The Baltimore and New York boards would do well to look up the certificates which have been issued by them to this young man of various aliases.

A customer in a Pittsburg drug store handed in for compounding a prescription calling for syrup of ipecac. The druggist took the prescription, filled it, labeled the bottle, did up the package in the customary manner and handed it to the customer. A little later, however, the druggist ascertained that the man had taken the wrong package, having in some way changed it with one that lay upon the counter, also awaiting delivery, but which, instead of syrup of ipecac, contained tincture of opium. The druggist made every effort to discover the name and residence of his customer, but without success, until after a dose from this wrong bottle had been given to a nine-days' old child, and in consequence of which the child's life was sacrificed. Just whose was the fault only a rigid investigation, which is now in progress, can determine, whether the error was due to the druggist's carelessness, or, as some suppose, to the customer hurriedly picking up the wrong package from the counter. At any rate, the case furnishes another instance to show that safety is attained and preserved only by eternal vigilance.

A druggist in an Iowa town owned a drug store which was insured in two companies for \$4,000. The store burned down. The companies refused payment of the insurance, first, on technical grounds. Defeated in that course they openly made the charge that the druggist set fire to the building in order to get the insurance. They were defeated here also. The druggist then brought suit against the insurance companies for damages, charging conspiracy and malicious prosecution. He collected evidence showing that a certain witness against him was to receive \$150 for preliminary affidavits, \$300 when the indictment was secured, \$300 when the druggist was convicted and \$300 when the policies were returned. For his plucky fight to defend himself, the druggist has just been rewarded by a judgment in his favor to the amount of \$6,500. Very little consideration is ever shown an insurance company, but here seems to be a case where they do not deserve even the least.

The movement to secure a system of parcels post, as has been mentioned in this journal several times recently, seems to be well along toward early final success. A Parcel Post League has been organized in Chicago, the officers of which are influential business men, the drug trade having competent representation, and as all argument and reason seems to be in favor of the object of this league, it would seem that its efforts to secure parcels post regulations between this and other countries should be crowned with success. The United States is about the only important country now without such regulations, and it is desirable that it should get into the procession and near the hand wagon just as soon as possible.

A certain prominent actress died recently. It is now reported, and not vaguely either, that her death was due, not to the causes assigned by physicians, but to her too liberal use of a certain quack obesity cure. She was in the habit of swallowing this nostrum in most liberal quantities. We shall probably never know definitely whether her death was due to this expensive and reprehensible habit, but the mere suspicion constitutes sufficient warning against following her example. The habit of self-prescribing on

the part of the public, and using secret preparations for diseases or ailments even more mysterious in their character, is a most vicious and dangerous one.

A drunken woman entered a drug store in San Francisco and purchased from the clerk some carbolic acid, which she used afterward as a means of suicide. Another customer, who was in the store at the time, testified that he called the clerk's attention to the fact that the woman was drunk, and that he asked the clerk if he intended to sell poison to her, but was told to mind his own business. This constitutes a very serious charge against the clerk, if it can be substantiated. State's prison is none too good for a druggist who is so regardless of his responsibilities and duties.

A St. Louis druggist has paid a fine of \$200 in preference to spending ten days in jail. This druggist is the president of a well known cut-rate drug store in that city, and a few months ago an injunction was issued against him restraining him from selling a certain patent medicine, but which injunction he disregarded, and continued selling the goods. This instance will go to show that the manufacturers can, if they will, keep their goods out of the hands of cutters, or at least punish the latter for violating trade regulations.

A correspondent who has read the lecture by Mr. Ebert in the Era of April 14, wants the writer to give his reason for the advice not to wash bottles in hot water. Mr. Ebert accordingly gives the reason by saying: "When bottles are immersed and rinsed in hot water, a vapor film attaches itself to the inside of the bottle, which on drying, leaves the glass less transparent than when water is used of ordinary temperature."

Attention is also called to a typographical error in the same lecture. The word "defectarius" was printed "repectarius."

A short time ago the president of Olivet College caused the arrest of certain prominent druggists of Charlotte, Mich., on the charge of selling liquor to students of the college. He was not successful in establishing his charge, and one of the druggists now has in turn commenced suit against him for malicious prosecution. The case is exciting considerable interest in that section of Michigan. The druggists complained of are prominent, and held in high regard by the citizens generally, and seem to have the sympathies of the community on their side.

The Michigan State Dairy and Food Commission in a recent bulletin states that its policy in the past to proceed against the wholesaler rather than the retailer, will be modified in the future. It has been found very difficult to establish that a retailer purchased adulterated goods of a certain jobber, and on this account conviction is very uncertain. Hereafter, retailers will have to stand their share of responsibility for the sale of adulterated goods.

PURIFICATION OF PROTEIDS.—The recently precipitated or coagulated protein substance, e. g. casein, is treated in an extraction apparatus with cold acetone until a sample proves to be free from fat and nearly free from water. The use of acetone has the advantage of removing the fat and dehydrating in a single operation, being a good solvent for fats and also miscible with water. The separate and expensive treatment with alcohol and ether is thereby avoided. The acetone is readily recovered by distillation and can be used over and over again. The process is patented. (Südd. A. Ztg.)

ANILINE COLORS IN GERMANY.*

It is known to most chemists that aniline chemistry is one of the most occult and complicated of modern sciences, the development of which has created a special literature that now embraces a whole library of works which are incomprehensible to any person except an educated chemist. A degree as doctor of philosophy, won by years of study in a university, with practical laboratory work and attendance at lectures by professors who have given their lives to the chemistry of coal-tar derivatives, is considered essential to prepare a young man to begin with even the rudiments of actual work in the manufacture of aniline colors. The utmost that can be done in a report of this character will be to show some of the more important and obvious conditions which underlie the aniline industry and the methods by which Germany has attained her undisputed supremacy in that branch of manufacture.

Aniline chemistry was originally an English discovery, and for many years British laboratories were foremost in the production of coal-tar colors; but the superior technical training and chemical skill of the Germans have enabled them in recent years to wrest the supremacy in this branch of applied science from all competitors, so that, notwithstanding the eminence of French and Swiss chemists, Germany now manufactures nine-tenths of all the coal-tar dyes produced in all countries, and this to a considerable extent from raw materials—benzole and anthracene—imported to this country from Great Britain.

Coal-tar colors may be divided commercially into two categories: First, the old, standard dyes, such as eosines, safranines, the soluble alkaline blues, and others, the patents on which have expired and which can therefore be made at will by anyone having the requisite facilities; second, the large and important class of dyes of all shades and colors that have been discovered during the past fifteen years by European chemists, and patented in all countries where patents are granted to inventions, notably in the United States. An examination of the records of the United States Patent Office will show more than a thousand patents granted to German chemists alone for processes and combinations covering the production of coal-tar colors.

The development of the aniline industry in the United States meets, therefore, at the outset two difficulties: The standard colors, open to competitive manufacture everywhere, are produced so abundantly and cheaply that their production yields but a relatively meager profit; while, on the other hand, the rarer dyes, which yield large profits, are almost without exception patented monopolies in which competition is impossible. As an example of the decline in the market value of a coal-tar color, the manufacture of which is open to free competition, may be cited the group of scarlets, which a very few years ago were protected by patents and sold for 10 marks (\$2.38) per kilogram (2.2046 pounds). Since the patents on these colors expired, a special establishment has been built in this country for their production, with the result that they are now to be had in any quantity for from 1.70 to 1.80 marks (39 to 42 cents) per kilogram. Even an ad valorem duty of 35 per cent. adds but little to the market value of such products in the United States, and their original inventors no longer produce them, but, when an order is received, purchase them from a laboratory expressly devoted to their manufacture. When it is remembered that all the leading aniline laboratories in Germany pay large dividends and have their entire plants "written off" on their books—that is, paid for—it will be seen how difficult it would be for a new plant, with originally invested capital, to start in competition with them in the common and cheaper class of dyes.

The manufacture of coal-tar colors in the United States is no new or untried enterprise. Many years ago a laboratory for that purpose was established at Albany, another at Brooklyn, and a partially successful effort was made at Cleveland in the '80's to produce aniline colors from the

refuse of petroleum distillation. The great chemical works of Friedrich Bayer, at Elberfeld, where one hundred skilled chemists and twenty-five educated engineers are now employed, have in operation at or near New York a special laboratory for the manufacture of certain standard dyes, the materials for which can be imported or otherwise cheaply obtained in the United States. The firm of Heller & Merz, New York, produces eosines and magentas; another firm manufactures, successfully, Bismarck brown and nigrosines, all of which colors are of moderate price and not protected by patents. It will be remembered that the manufacture of aniline colors involves the use of raw material, not only of the crude coal-tar derivatives, but of sulphuric, nitric, and hydrochloric acids, besides alkalies and other chemicals which are mainly imported and therefore more costly in our country than in Europe, although some progress has been made in recent years toward their production in the United States.

But the great advantage possessed by Germany in this competition lies in her command of abundant and cheap chemical skill and specially educated operatives. The universities, the polytechnic and technical schools of this country turn out a constant throng of scientific chemists and educated workmen, specially trained and prepared in the processes of chemical manufacture, and willing to work for wages that college graduates and the better class of operatives in America would refuse. As has been stated in a former report of this series:

The great aniline and chemical laboratories of Hoechst, Mainkur, Ludwigshaven, Elberfeld and Berlin employ, in addition to their regular working force, a large staff of young chemists—from fifty to seventy at each establishment—whose sole function is that of research, the tireless quest of something new and valuable, whether it be a new color or pharmaceutical product, or a cheaper, more direct method of producing some such product that is already known and in use. They are mostly young graduates, fresh from the universities, and work for small salaries in laboratories perfectly equipped and supplied by their employers, under contracts which provide that whatever valuable discovery they make shall be patented and the patents transferred to the company, the inventor receiving a specified percentage of the profit accruing thereafter from its manufacture and sale. A single fortunate discovery may thus make the fortune of the inventor, and, under the spur of such an incentive, many of the most important chemical discoveries of recent years have been made by men under twenty years of age, working for less than \$500 a year for great corporations that pay annual dividends of 15 to 25 per cent. to their stockholders.

It is here, in the consummate scientific skill and highly educated labor that are so abundant and cheap in Germany, that this country enjoys the decisive advantage that enables the German aniline chemists to dominate and control the coal-tar color manufacture of the world.

In respect to the cost of labor in this industry, it will be sufficient for the present purpose to give the wages of the different classes of employees in the Farbwärke at Hoechst, which may be taken as in all respects a standard establishment of its class.

Wages, per week of sixty hours: Skilled operative in laboratory, \$4.28; workman in laboratory, \$4.21; mechanic, \$4.05; yard laborer, \$3.58. As a partial offset to these low wages, the employees of the Farbwärke live at cheap rents in good houses provided by the company; have the services of a physician, and are assisted by wholesale purchases of groceries and other articles of household use through a well-managed Consum-Verein. The company is also obliged by law to furnish its employees with bathing facilities at the works, and to make a certain provision for them in old age or in case of disability.

It should not be understood that Germany is to any serious extent dependent upon Great Britain or other foreign countries for aniline materials. English canal coal is far richer in anthracene than either German or American coals, and, being largely used in gas manufacture, there is produced in the United Kingdom a surplus of anthracene, of which a considerable share comes to Germany. But for benzole, the original raw base of most coal-tar derivatives, which is produced directly from the roasting of bituminous coal, Germany depends upon her own resources, the great coking plants of Westphalia and Silesia, where the coke for iron and steel manufacture and for domestic and other heating purposes is made

* In response to a request for information regarding the manufacture of coal-tar colors in Germany, a Department instruction from the United States Consular Department was sent on September 29, 1897, to several consulates. The following report has been received from Frankfurt.

In retort ovens, that save the precious secondary products—gas, tar, ammonia and benzole—which America and England pour out of their open-mouthed "bee hive" coking ovens to blacken and defile the surrounding country. So cheap and abundant has this material become in Germany, that much less benzole is imported here from England than hitherto; and aniline salt, a prepared product used in aniline manufacture, is exported to the United States by not less than four different shippers in the Consular district of Frankfurt. The rate at which this export is increasing indicates that the manufacture in our country of certain coal-tar colors is steadily gaining in importance, although the United States paid for imported aniline colors in 1896 not less than \$3,072,915.

It is useless for anyone, even an expert, to attempt to obtain from any laboratory in Germany any secret information concerning the ingredients or processes employed in the manufacture of a color which the owner of such process wishes to conceal. Competition between the leading laboratories is strong and determined, and their secrets are so well guarded that even the workmen who carry on the work of manufacture are not permitted to know, each for himself, the full process involved in the creation of any finished product.

Of the vast library of technical literature on this subject, one of the works most concise and fertile in specific information likely to be useful to the inquirer, is the "Systematic Survey of the Organic Coloring Matters," by Schultz and Julius, edition of 1897. In this authoritative volume will be found registered 594 of the most important coal-tar dyes manufactured in Germany, and there is shown in the case of each color its commercial name and the location and name of its manufacturer; its chemical and scientific name; empirical and constitutional formula, showing the elements of which it is composed, and their method of combination; inventor and date of discovery; the numbers and dates of patents in all countries; literature concerning it; its behavior with reagents; shade and dyeing properties—in short, a complete scientific description and record of each dye and its properties by the foremost authority on the subject in Germany.

How long the present conditions will remain unchanged and operative, and hold the United States dependent upon Europe—especially Germany—for 90 per cent. of its supply of coal-tar colors, is hardly within the province of a layman to conjecture. The use of such colors, not only for dyeing textile fibers, but for colored printings inks and other purposes, is steadily growing, and the resumed activity of American textile manufactures has caused a decided increase in the importation of dyestuffs. Emancipation from dependence upon foreign supplies will probably come slowly, and when we as a people have learned and utilized the lesson which Germany has made so plain and convincing. When American iron-masters save the by-products of coke manufacture which they now waste; when education is specialized and young men are trained in colleges and universities, not only for the overworked professions of law, medicine and journalism, but to know thoroughly and practically the application of advanced science to productive industry; when our people have learned to produce from the abundant materials at home the "heavy chemicals" which are now so largely imported, when Americans learn to economize materials as they economize labor, and to sell the higher products of scientific manufacture in foreign markets as skillfully as they are now marketed at home—then the foundations of a permanent emancipation will have been laid.

FRANK H. MASON, Consul-General.

ARTIFICIAL ESSENCE OF VIOLET.—A new synthetic substitute for violet extract is obtained from oil of lemon in the following manner by a patented process: Oil of lemon and acetone in alcoholic solution are boiled for 16 to 18 hours in presence of pure calcium chloride and a small quantity of an aqueous solution of cobalt nitrate. The excess of acetone and alcohol is then distilled off, the residue heated with an acid solution of sodium sulphate for a week and finally subjected to a fractional distillation. Products of disagreeable odor first distill over, and subsequently, at 112° to 150° C., under 12 mm. pressure, the violet essence. (Zitsch, *ang. Chem.*)

MONAZITE SAND OF NORTH CAROLINA.*

O. BOUDOUARD.

Monazite sand is found in considerable quantity in Brazil, Liberia, and North and South Carolina. The deposits in North Carolina are situated in the counties of Burke, McDowell, Rutherford and Cleveland. The sands are met with in river beds together with other minerals, such as quartz, feldspar, hornblende, magnetite, zircon, rutile, corindon, etc. They are disintegrated products of certain rocks, and by virtue of their specific gravity, the richest portions of the alluvial deposits are found in the upper reaches of rivers. They consist of the phosphates of rare earths (cerium, didymium, lanthanum, yttrium), and also contain the oxides of thorium, zirconium, and of titanium, together with silica in varying proportions.

The ore forms crystalline spangles varying in color from pale yellow to yellowish-brown. Its value depends upon the thorium oxide it contains, and the present paper gives a method applied by the author in analyzing monazite sands of North Carolina. He states that sands from Brindletown contain 4 to 6.6 per cent. of thorium oxide, whilst those from Shelley contain 2.76 per cent. Operating with 29 grams of the finely powdered ore, this was fused with twice its weight of sodium carbonate, extracted with water, and the residue ignited with sulphuric acid and afterwards treated with hydrofluoric acid. The portion remaining, which is always present, is termed insoluble residue. The aqueous alkaline extract serves for estimating the phosphates, whilst the solution of the sulphates is mixed with sodium sulphate and allowed to stand at least 24 hours, when the double sulphate is filtered off and washed with a cold saturated solution of sodium sulphate. The double sulphate of the cerium earths thus obtained is decomposed with caustic soda, and the oxides are converted into nitrates. These are fused with five parts of potassium nitrate at a temperature not higher than 340° C., and when the evolution of nitrous vapours has ceased, the fused mass is treated with water, when the cerium remains as a dioxide. Ammonium precipitates lanthanum and didymium from the mother-liquor. These can be separated to a certain extent by fusing their nitrates at 400° C., which gives pure lanthanum oxide, although a portion remains with the subnitrate of didymium, which separates below that temperature.

The mother-liquor from the double sulphates of the cerium earths is precipitated by ammonia; the filtrate contains the alkalis and the metals of the alkaline earths, with the exception of magnesium, whilst the precipitated oxides, after washing, are boiled with aqua regia, when the titanium separates as metatitanic acid. The neutralized liquor, on treatment with oxalic acid, gives a precipitate of the oxalates of thorium and the yttrium earths. Since the former gives a double sulphate of potassium and thorium, it can be easily separated.

The mother-liquor contains zirconium, iron, aluminum, beryllium, magnesium, and the titanium which was not separated as metatitanic acid. Zirconium and titanium are precipitated as thiosulphates, and the former is separated from the latter as a double sulphate of zirconium and potassium. The iron, aluminum, and beryllium are precipitated by ammonia in presence of ammonium chloride, and the oxides are digested with ammonium carbonate to remove the beryllium. Finally the magnesium is precipitated as magnesium ammonium phosphate.

An analysis of monazite sand carried out in this way gave the following result: $\text{SiO}_2=5.76$, $\text{TiO}_2=6.83$, $\text{P}_2\text{O}_5=39.48$, $\text{ThO}_2=2.42$, $\text{ZrO}_2=5.75$, $\text{CaO}=12.50$, $\text{Li}_2\text{O}+\text{La}_2\text{O}_3=8.07$, yttrium bases (M_2O_3)=0.48, $\text{Fe}_2\text{O}_3+\text{Al}_2\text{O}_3=0.85$, $\text{Be}_2\text{O}_3=\text{traces}$, $\text{MgO}=3.74$, $\text{CaO}=\text{traces}$, Gas=0.20, Insoluble residue=1.55. Total=101.23.

According to some chemists a difference is made between the terms "monazite sand" and monazite," the latter being considered by some as only an integral part of the former. The following analysis from the *Chem. Zeit.*, of August 5, 1896, is thus expressed: Oxide of iron, 3.50; titanate acid, 4.67; silica, 6.40; monazite, 85.43. Total, 100.00. (See also *Jour. Soc. Chem. Ind.*, 1896, 675.)

SYRUP OF IODIDE OF IRON.—The following formula is proposed by Lutand (*Med. Zentr. Ztg.*): Iron and potassium tarrate 20 p., potassium iodide 20 p., cinnamon water 60 p., simple syrup 100 p. (Ap. Ztg.)

* *Bull. Soc. Chim.* 1898, 19, (1), 10-13; (*Jour. Soc. Chem. Ind.*)

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblentz, A.M., Ph. M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Wilbur G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Phm. B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M.D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college, for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, and his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 27, 1898; the second term began February 17, 1898, and will end June 30, 1898. The junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum, and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 65.

Inorganic Chemistry,

Silver (Continued.) Gold.

COMPOUNDS OF SILVER.

Halogen Compounds.—Silver chlorid, AgCl , is white, insoluble in acids, soluble in ammonia. The bromid, AgBr , and iodid, AgI , are yellowish-white, insoluble in acids, and very sparingly soluble in ammonia. All are darkened by light, and on this account are used in photography. They are soluble in solutions of sodium thiosulfate and of potassium cyanid.

Silver fluorid, AgF , is a deliquescent salt, soluble in half its weight of water.

Oxygen Compounds.—Three oxids of silver are known, the suboxid, or argenteous oxid, Ag_2O , the normal or argentic oxid, Ag_2O , and the per or dioxid, Ag_2O_2 . All are instable yielding up their oxygen readily to oxidizable substances, and hence liable to react explosively when triturated with organic matter.

Argentic oxid, Ag_2O , corresponds to the normal silver salts, and is produced when one of the latter is precipitated by a fixed alkali. With ammonia it forms an intensively explosive substance known as Berthollet's Fulminating Silver, which decomposes with the slightest friction.

Salts of Oxygen Acids.—Silver nitrate, AgNO_3 , formed by dissolving silver in nitric acid, evaporating and crystallizing. When mixed with a small amount of silver chlorid, fused and cast into sticks, it is known as lunar caustic. Is much used by surgeons as a caustic substance, and in practical chemistry as a reagent.

Silver cyanid, AgCy , is produced as a white precipitate when a soluble cyanid is added to a silver solution. Is soluble in excess of the alkali cyanid to form a double cyanid. It is of use in pharmacy for the extemporaneous preparation of hydrocyanic acid, by the following reaction.



Characteristic Reactions.—Silver salts are quite easily detected by the number of insoluble precipitates which they form. With hydrochloric acid or a soluble chlorid there is precipitated the white silver chlorid, insoluble in acids, soluble in ammonia. With potassium cyanid they yield a white precipitate, soluble in excess of the reagent. With arsenites and phosphates a light yellow precipitate. With arsenates a dark red precipitate of silver arsenate.

GOLD.

Symbol Au. Valence 1 and 3. Atomic Weight 196.7. Specific Gravity, 19.26.

Historical.—Like the other metals of this group, gold has been known since prehistoric times. On account of its occurrence in the native state, its beautiful color, brilliant luster, and its softness, permitting it to be easily worked, it was early prized by primitive man, and by him wrought into articles of use or ornament. In every language the name for gold refers to its color or luster. The English name is of Anglo-Saxon origin. The symbol is derived from the Latin name "aurum."

Natural Occurrence.—Gold is one of the most widely distributed of metals, occurring in almost all parts of the world, but in only a comparatively few localities in such quantities as to admit of profitable working by present known methods.

It occurs mainly in the native state, either embedded in lodes or veins of quartz traversing trap and slate rock, or as "nuggets" or "dust," distributed through gravel beds, which have resulted from the disintegration of gold-bearing rocks. The size of the nuggets may range from microscopic particles to masses of considerable size. The largest lump ever found was the famous Ballarat nugget from Ballarat, Australia, which weighed 2,166 ounces, and was valued at \$41,882.

The metal also occurs to some extent associated with tellurium, as a gold tellurid. Iron pyrites are also frequently gold-bearing, and constitute a valuable and important source of gold.

Preparation.—The extraction of gold varies according to its origin. The primitive method of separating it from gold-bearing gravels is by panning. A pan of convenient size is partly filled with gravel, water added, the larger pebbles picked out with the fingers, and the pan given a circular motion in such a way that the lighter particles are carried over the side, while the heavier gold subsides to the bottom. Other methods are by cradles or sluices, which are essentially long troughs or boxes through which a mixture of gravel and water is caused to flow, the sand and pebbles being carried off by the current, while the gold is caught by slats or "riffles" nailed across the bottom.

Where the gold is contained in rock, the latter is

crushed to powder by heavy stamps, and the resulting mud mixed thoroughly with mercury, which readily dissolves the gold to form an amalgam. The latter is freed from excess of mercury by straining through leather bags, and the remainder driven off by heat, leaving the gold behind in a porous mass, which is then further purified, melted and run into ingots.

Other methods of extraction are the chlorination process, the cyanid process, etc. These are especially applicable to poor ores, and for their further description the student is referred to works on metallurgy.

The Refining of Gold.—As commonly found, gold usually contains a small amount of other metals, silver, lead, antimony, iron, etc., from which it must be freed, as a very small amount of impurity may materially affect its qualities. One method of purification consists in melting in a graphite crucible with a mixture of potassium nitrate and borax. The nitre oxidizes the baser metals to oxides, and the latter are taken up by the borax, with which they form a fusible slag which can be poured off, leaving the gold in a state of comparative purity.

Another method of refinement consists in dissolving out the base metals by means of acids. As the acid would ordinarily be able only to reach the base metal contained on the surface of the mass, some means must be provided whereby it can penetrate to the interior. For this purpose a process of "quartation" is employed, which consists in first adding to the gold so much of another metal, as silver, that the gold constitutes not more than one "quarter" of the resulting mass. The metals are thoroughly mixed by melting them together two or three times, and granulated by pouring the melted metal into water. The granulated metal is then heated several times in a flask with either nitric or sulfuric acid, by which means the base metals are dissolved out, and the gold left behind in a spongy, brown or black mass. After washing free from acids, it is dried, fused and cast into molds.

Description and Physical Properties.—Gold has a rich yellow color, has a beautiful luster, and is capable of receiving a brilliant polish. It is the most malleable and ductile of all metals, and has been drawn into wire 1.5-000 of an inch in diameter, and beaten into leaves the 1-370,000 of an inch in thickness.

In very thin leaves it transmits a greenish colored light, which becomes ruby red when the foil is heated. The specific gravity is 19.26 to 19.4. It fuses at about 1050° C. and can be volatilized by the oxy-hydrogen flame.

Pure gold is nearly as soft as lead, and possesses the valuable property of welding in the cold. This latter is one of the qualities which render it so valuable as a dental material. The gold being introduced into cavities, is welded into a coherent and solid mass by the pressure of the "plugger." Its weldability is materially affected by contamination with other metals.

Preparation of Gold Foil.—An important form of gold for dental and mechanical purposes is that of "gold leaf," seen in packages consisting of very thin sheets of gold foil, separated from each other by intervening sheets of paper.

The thicker grades of leaf are prepared by rolling, but for the finer grades no process has been found equal to that of beating. For this purpose the gold ingot is first rolled into thin ribbon, which is then cut into small squares. The squares are then placed between sheets of "gold beater's skin," prepared from the intestines of the ox, and a number of these being piled together, are beaten on a marble or wooden anvil with a heavy mallet. After a certain amount of beating, the leaves are transferred to another similar package and the beating continued. Lastly the leaves are trimmed square, and put up in the familiar packages seen in the shops.

Chemical Properties.—Gold is not affected by air or water, either cold or hot, nor by sulfur, nor by nitric, hydrochloric or sulfuric acid. It is dissolved by chlorine, bromine, iodine, and when in fine powder by potassium cyanide. It is also attacked by the fixed alkalis, by the nitrates and by selenic and hydrobromic acids. The best solvent is aqua regia, the free chlorine of the latter being the active agent.

Metallic gold is readily thrown down from its solutions by metals, by light and heat, and by nearly all reducing agents.

Alloys.—On account of its extreme softness, pure gold cannot be used for coinage or jewelry, and is hardened by alloying with either silver or copper, or both. The addition of silver tends to lighten the color to greenish yellow, and of copper to brighten the color or make it reddish. When the two metals are added in equal amounts, the pure gold color is not perceptibly affected.

The result of alloying gold with other metals is not only to increase its hardness, but to lower its melting point, and to decrease its malleability and ductility. The presence of so little as one part of antimony, lead or bismuth in 1020 is said to render the gold quite unworkable.

Gold dissolves readily in mercury, the resulting amalgam varying from a thin liquid to a stiff mass in proportion to the amount of gold present.

There are two methods of indicating the proportion of gold in an alloy or its "finesness." By the old method of "caratation," the proportion of gold is given in twenty-fourths. Thus, pure gold is 24 carats fine; 22 carat gold is 22-24ths gold and 2-24ths alloy metal; 18 carat is 18-24ths gold and 6-24ths alloy metal, and so on. This method is still largely followed by jewelers. The later and better method is by giving the number of parts of gold in the thousand. Thus, gold 900 fine is 900 parts pure gold and 100 parts alloy metal. This is the standard coinage alloy of United States coinage and of most civilized countries.

COMPOUNDS.

Gold forms two classes of compounds, aurous and auric. In the first the metal acts as a monad, and in the second as a triad.

Halogen Compounds.—Chlorine, bromine and iodine each forms an aurous and an auric salt. The aurous compounds are mostly insoluble, and the auric soluble. All are instable in the presence of reducing agents. Auric chloride or trichloride, AuCl_3 , has a limited use in medicine. Mixed with an equal weight of sodium cyanide, it is official as Gold and Sodium Chloride. It is also used in the preparation of toning solutions in photography.

Oxygen Compounds.—The two leading compounds with oxygen are aurous oxide, Au_2O_3 , and auric oxide, Au_2O_3 . They are dark brown or black powders, and are of importance only as representing the two series of gold compounds. Both are capable of acting as acids with strong bases.

Fulminating Gold.—From auric chloride solution, ammonia precipitates yellow ammonia aurate, $(\text{NH}_4)_3\text{Au}_2\text{O}_4$, or "fulminating gold," violently explosive when warmed or lightly triturated.

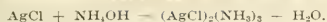
Purple of Cassius.—When a mixture of stannous and stannic chlorides is added to a solution of a gold salt, a fine purple precipitate is produced, known from its discoverer as the purple of Cassius. The precipitate seems to be a mixture of aurous, stannous and stannic oxides. Owing to the fineness of the precipitate, it remains suspended for a long time, giving the appearance of a rich purple liquid by reflected light, and blue by transmitted light.

The purple of Cassius is used to impart a red or purple hue to glass, and is the material used by manufacturing dentists to impart a natural color to the gum work of artificial teeth.

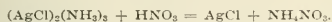
Characteristic Reactions.—The most characteristic reaction of gold salts is the production of the purple of Cassius. Hydrogen sulfide passed into solution of an auric salt yields a brown precipitate of gold disulfide, Au_2S_3 , soluble in ammonium sulfide. Solutions of oxalic acid and of ferrous sulfate produce a precipitate of metallic gold, dull brown in color, but showing the metallic luster when dried and gently burnished with the finger nail. Solutions of sugar or gum arabic added to acid solutions of auric salts produce the precipitation of metallic gold in the form of brilliant shreds and spangles.

PRACTICAL STUDIES.

1. To a solution of silver nitrate add hydrochloric acid until a precipitate ceases to form, and let stand until the precipitate subsides. Write the equation.
2. Pour off the supernatant liquid from the last precipitate and add some nitric acid. Does it dissolve?
3. Pour off the acid, and rinse the precipitate with water. Add ammonia water, and shake. What occurs? Balance the equation—



4. To the clear solution last obtained add nitric acid. What takes place? Balance the equation—



5. To some more solution of silver nitrate add solution of sodium arsenate. What takes place? Write the equation, assuming that the red compound is silver arsenate, Ag_3AsO_4 .

6. In a clean test tube add ammonia to silver nitrate solution until the precipitate at first formed is just re-

dissolved. Now add a few drops solution chloral hydrate and heat the mixture. What is produced?

7. To a solution of gold and sodium chlorid, very dilute, add gradually solution of stannous chlorid, to which has previously been added some solution of ferric chlorid. If the solution is dark colored, dilute freely with water. Let stand until the precipitate subsides.

8. To another portion of the solution of gold and sodium chlorid add either some solution of oxalic acid or a fresh solution of ferrous sulfate; warm the mixture and observe the change.

LECTURE No. 66.

The Elements of Pharmacognosy.

By PROF. L. E. SAYRE, B.Sc., Ph.M.

BARKS.

Barks are obtained from exogenous stems and roots. The outer surface of stem barks is not infrequently beset with patches of lichens, producing a variegated color; the external and internal color is quite characteristic of some barks, as for example Wild Cherry. We have here a greenish color on the outside, and a brownish on the inside, but the exact shade of color is often very difficult to describe.

One of the principal general characteristics of the barks is found in the odor or in the taste. This, taken in connection with the color and texture, furnishes here probably the best means of classification. Some knowledge of a microscopical structure is very important as a means of distinguishing between individual barks, but it is not the purpose of the present lectures to go into histological description.

Lenticels.—Occasionally the term lenticel is used in physical description of barks, as in the case of Frangula. This bark is officially described as "quilled, about 1 mm. thick; outer surface grayish brown or blackish brown, with numerous small, whitish, transversely elongated lenticels." etc. Lenticels appear as ruptures in the epidermis of the bark, due to the growth of cells at certain points beneath. The continuity of the epidermis is ruptured by fissuring at these points, and the cells from beneath protrude, giving to the surface a freckled or spotted appearance. It would be well for the student to familiarize himself with this characteristic, and with the aid of a pocket lens examine such barks as frangula in order to study the structure referred to.

A table of the official barks, arranged according to prominent physical properties, is here presented.

A selection from this list for the purpose of calling attention to some prominent physical characteristics of the bark may here be given:

Cinnamomum Zeylanicum.—This variety of cinnamon comes into the market in long, cylindrical quills deprived of the corky layer by scraping; compound, consisting of a number of thin, papery, light brownish-yellow layers, enclosed one within the other, their sides curling inward.

Cassia Cinnamom and **Saigon Cinnamom** are quite different from the above in being much thicker. Cassia is yellowish-brown, in single, rarely double, quills, deprived of corky layer. Saigon cinnamon occurs in unscraped quills, outer surface grayish-brown, with white patches, rough and warty, inner surface brownish. The medicinal uses and effects of the different varieties are the same.

Sassafras has an unmistakable odor and taste. It comes into the market in irregular, light rust brown fragments.

Among the acrid barks, two very fibrous ones should be noted.

Mezereum.—Tough, pliable, narrow strips, with a very thin greenish orange or purple periderm over a green layer, inner surface white and silky from long fibers.

Gossypii Radicis Cortex.—Cotton root bark. Flexible bands or quills, periderm brownish-yellow, inner surface whitish, with a silky luster, fibrous.

Among the bitter barks we have:

Juglans.—Butternut. Thin, gray periderm, easily separating from the smooth, deep-brown inner bark.

Frangula.—Thin quills, with an easily separable, blackish-brown periderm marked with white dots (see also above).

Rhamnus-Purshiana.—Cascara Sagrada; cork brown-

OFFICIAL & COMMON NAMES.	NATURAL ORDER.	BOTANICAL ORIGIN.	HABITAT.
Aromatic.			
Sassafras (Sassafras Bark).	Laurineæ.	Sassafras varilfolium.	North America, from Kansas eastward.
Cinnamomum Zeylanicum (Ceylon Cinnamon).	"	Cinnamomum Zeylanicum.	Ceylon.
Cinnamomum Cassia (Cassia Cinnamon).	"	Cinnamomum.	China.
Cinnamomum Saigonicum (Saigon Cinnamon).	"	Cinnamomum.	Cochin China.
Cascarilla (Cascarilla Bark).	Euphorbiaceæ.	Croton eluteria.	Bahama Islands.
Acrid.			
Quillaja (Soap Bark).	Rosaceæ.	Quillaja saponaria.	Peru and Chill.
Xanthoxylum (Prickly ash).	Rutaceæ.	Xanthoxylum Americanum.	United States.
Mezereum (Mezereum).	Thymelacææ.	Daphne mezereum.	Mountainous regions of Europe.
Gossypii Radicis Cortex (Cotton Root Bark).	Malvaceæ.	Gossypium herbaceum.	Asia and Africa.
Aspidosperma (Quebracho).	Apocynaceæ.	Aspidosperma quebracho blanco.	Argentina Republic.
Bitter.			
Juglans (Butter Nut).	Juglandaceæ.	Juglans cinerea.	North America.
Frangula (Buckthorn).	Rhamnaceæ.	Rhamnus frangula.	Europe and N. Asia.
Rhamnus Purshiana (Cascara Sagrada).	Rhamnaceæ.	Rhamnus purshiana.	California and Oregon.
Eunonymus (Wahoo).	Celastrineæ.	Eunonymus a. roripureus.	United States.
Bitter and Astringent.			
Cinchona (Peruvian Bark).	Rubiaceæ.	Cinchona callisaya and C. officinalis.	South America.
Prunus Virginiana (Wild Cherry).	Rosaceæ.	Prunus serotina.	North America.
Viburnum Opulus (Cramp Bark).	Caprifoliaceæ.	Viburnum opulus.	North America.
Viburnum Prunifolium (Black Haw).	Caprifoliaceæ.	Viburnum prunifolium.	United States.
Astringent.			
Quercus Alba (White Oak).	Urticaceæ.	Quercus alba.	North America.
Rubus (Blackberry).	Rosaceæ.	Rubus villosus and R. Canadensis.	North America.
Granatum (Pomegranate).	Lythraceæ.	Punica granatum.	North America.
Mucilaginous.			
Ulmus (Slippery Elm).	Urticaceæ.	Ulmus fulva.	Various parts of Asia.

ish-gray or whitish; inner surface brown or nearly black after exposure; fracture yellow.

Euonymus.—Wahoo. Periderm ash gray, scaling off from the yellowish-brown inner bark.

Classified among the bitter and astringent barks we have the most important member of the whole group.

Cinchona.—To give a satisfactory description of this bark such as would include the many varieties now coming into our market would be here impossible. The student is referred to the United States Dispensatory for most excellent and full description of the prominent varieties. We may say here simply that cinchona comes in quills or curved pieces, or thick, flat pieces; cork whitish or brownish-gray; inner bark reddish, varying in shade in different species.

Among the astringent barks we have *Quercus Alba*, representing a coarsely fibrous structure. It is deprived of cork. The same is true of the mucilaginous Elm bark, or *Ulmus*. The latter is an excellent specimen of a tough and flexible bark.

Leaves are classified according to their form, which is considered from four different standpoints. (1) General outline of the blade; (2) of the apex; (3) of the base; and (4) of the margin. Odor and taste are also considered as characteristics which may be used in classification. The following synopsis of the leaves is here presented:

I. MARGIN ENTIRE.

- (a) Aromatic and Glandular. *Coriaceous*.
Linear, revolute, woolly beneath, green above.....*Rosmarinus*.
Oval—oblong, retuse, uneven at base, with the reticulate veins forming one or two wavy lines parallel to it, finely pellucid, punctate.....*Pilocarpus*.
Very long falcate, or scythe-shaped, pointed, uneven at base with a distinct marginal vein.....*Eucalyptus*.
(b) Not aromatic or glandular. *Coriaceous*.
Obovate, somewhat revolute, upper surface smooth and glossy.....*Uva Ursi*.
(c) Not aromatic or coriaceous.....
Lance oval, acute, uneven at base, nearly smooth; grayish green.....*Senna (Alexandria)*.
Lanceolate, acute, uneven at base, nearly smooth, much larger than *Senna Alexandria*.....*Senna (India)*.
Thin obovate-oblong, acute at base, midrib prominent, with a curved line on each side running from base to apex; odor and taste tea-like.....
Ovate-oblong acute, papery and smooth upper side, mostly brownish.....*Belladonna*.
Ovate-lanceolate, acute, papery, hairy, brown on both sides, friable; peculiar heavy odor.....*Tabacum*.

II. MARGIN TOOTHED OR CRENATE.

- (a) Not coriaceous.
Ovate, uneven at base, angular toothed, papery, smooth; light greenish, palmately veined, with midrib and petiole pubescent.....*Stramonium*.
Ovate-oblong, grayish green, hairy, the teeth large and triangular, shriveled and crumpled around the large midrib, and usually still attached to the large petiole; odor heavy, narcotic.....*Hyoscyamus*.
Ovate-obtuse, crenate, upper surface green, downy; under surface lighter, prominently meshed.....*Digitalis*.
Lanceolate, finely crenulate; green prominently veined, forming small meshes.....*Matricaria*.
Ovate-oblong, finely crenulate; grayish, wrinkled; soft and hairy; veining prominent.....*Scholia*.
Oval-obovate, obliquely heart-shaped, wavy-toothed, feather-veined.....*Hammamelis*.
Oblong-lanceolate, acuminate, sinuate serrate, smooth, feather-veined; very long, tapering at the end.....*Castanea*.
(b) *Coriaceous*.
Oblanceolate, sharply serrate; upper surface dark green.....*Chimaphila*.
Oval, obovate, rounded, crenate or serrate, glossy yellowish-green, pellucid-punctate, with a pellucid gland at the base of each marginal tooth.....*Ruehu (Short)*.
Lance-linear and thinner, but otherwise resembles preceding.....*Ruehu (Long)*.
Oblong-lanceolate; upper surface smooth, brownish-green and varnished with a resinous coating; prominently reticulated beneath.....*Eriodictyon*.

III—MARGIN LOBED; SUBCORIACEOUS.

Suborbicular, the division linear-lanceolate and furrowed above.....*Aconitum (unofficial.)*

IV—LEAVES TERNALE.

Lateral leaflets sessile, obliquely ovate; all entire or notched, smooth and brittle, light green, nerid.....*Rhus Toxicodendron*.

V—LEAVES BI-OR TRIPINNATE.

Pinnae thin, oblong-lanceolate, pointedly toothed.....*Conium (unofficial.)*

FLOWERS, PETALS, STIGMAS., etc.

In this class we have buds, expanded flowers, petals and stigmas. Among the undeveloped flowers we find *Caryophyllus (cloves)* and *Santonica (Levant wormseed)*. The former is easily recognized by its odor, and the latter also by a strong peculiar odor which readily identifies it. It will repay the student, however, to dissect these two immature flowers under the lens. The flowers of the clove tree are rose-colored, but for commercial purposes these are "nipped in the bud," so to speak, when we have what appears as a dark, almost black calyx tube, surmounted by a globular hollow head, formed by the unexpanded petals of the corolla. This globular form encloses the curved stigmas and the single style; a cross section of the lower part of the calyx tube, under the lens, shows a large number of oil cells.

Santonica is derived from a plant of the Compositae. Hence we have in this drug an unexpanded flower-head, or compound flower. The receptacle is surrounded by brownish imbricated scales, enclosing tubular-florets. Under the lens the number of scales and the number of rudimentary florets enclosed therein may be counted.

Two stigmas, *Crocus (saffron)*, and *Zeal (corn stalk)*, are medicinal. To the pharmacognosist the former presents the greatest interest. The plant, *Crocus sativa*, is a very ornamental one. Projecting from the throat of the funnel form, light purple corollas, the central style is found, and is terminated by three long convoluted stigmas. These have a thread-like appearance, but when magnified under the lens are seen to be tubular and notched above. If these characteristics of this expensive drug be well fixed in the mind, the common adulterants, such as safflower and marigold, may be easily detected.

Expanded Flowers.—The student is urged to add to and enlarge upon the descriptions given below:

I—AROMATIC.

- Flower heads borne on slender pedicels; composed mainly of short, tubular, yellow disc-florets, with a single ray of long white ray florets.....*Matricaria*.
Flower heads large, almost globular, with mostly white, strap-shaped rays.....*Anthem. (small)*.
Small cones consisting of the imbricated petals, which are deep purple, yellow at base.....
Separate petals; pink, brownish when dry.....*Rosa Gallica*.
.....*Rosa Centifolia*.
Ray florets only employed, delicately veined longitudinally, three at apex; odor narcotic.....*Calendula*.
Large flower heads with long papery, ray florets few, disk florets numerous.....*Arnica Flores*.
Calyx reddish, hairy, top-shaped, containing one or two nutlets; mixed with the reddish bracts; consist of inflorescence from which the petals have fallen.....*Cusco*.

FRUITS.

Botanically speaking, the fruit is a matured and ripened ovary; it may also include other organs, which mature in the process of development. In the fig the upper portion of the axis participates in the formation of the fruit. In the juniper berry, the three bracts of the flower become fleshy and form the bulk of the fruit.

The external covering of the ovary wall in the fruit is known as the pericarp. The external coat of the pericarp is called epicarp, and the inner pulpy portion, the mesocarp or sarcocarp. The ovary wall may develop into pericarps of very different textures. It is hard or bony in many capsules; tough and leathery in the rind of the orange and lemon; soft without and hard within in the peach and cherry, or succulent throughout, as in the gooseberry and cherry, etc. In the ceraspodium, we have a minute fruit (a utricle), with a very thin pericarp. By rubbing the small grains with the hand the capsular covering is easily rubbed off, exposing the black seed. The ceraspodium is a fruit, the product of the plants of the natural order of Umbelliferae. Aniseed, Fennel, Caraway, Conium and Coriander are official examples. Their fruits originate from one ovary. It divides itself into mericarps (half fruits), suspended by their summits from a slender axis (carpophore), usually two-forked. By the use of lens, these mericarps may be easily seen as described.

With few exceptions, the official fruits consist of ripened simple pistils; the exceptions are two aggregate fruits (star anise and raspberry), composed of several separate carpels belonging to one flower. There are a few collective fruits produced by the aggregation of several

or many flowers, such as juniper berries, hops and figs. Among the official fruits are also drupes, berries, capsules and akenes. In the synopsis below their prominent physical characteristics will be studied.

I.—AROMATIC.

- (a) **Cremocarps.**—Umbelliferous fruits consisting of two carpels or mericarps joined by their flat sides, but easily separable; the convex sides longitudinally ribbed with usually five ribs.
- Short, ovate, grayish.**.....Anisum.
Oblong, curved, brown......Carum.
Globular; brownish-yellow; mericarps closely cohering; about nine-ribbed......Coriandrum.
Nearly cylindrical, with prominent ribs, light greenish-brown......Feniculum.
Cremocarps, broadly ovate; laterally compressed; mericarps usually separated, each having five jagged ribs, odor feeble bitterish......Conium.
(b) Globular.—Very small; greenish-yellow or brownish.....Chenopodium.
Reticularly wrinkled; contracted below into a short stem or stipe......Cubeba.
Two-celled, two-seeded; brown; odor and taste clove-like......Pimenta.
Reticularly wrinkled; destitute of foot stalk......Fiper.
(c) Of Various Forms.—In bands or curved sections, externally dark brownish-green, or orange yellow.....Aurantii Cortex.
Conical, shriveled; pericarps red, shining and translucent......Capsicum.
Triangular; pericarp pale buff-colored, leathery......Cardamomum.
Strobiles, or cones, consisting of greenish or yellowish membranous scales with yellow glands (lupulin at their base)......Humulus.
Consisting of eight rust-brown, woody foliicles arranged in a star, each containing a flattish glossy brown seed......Ilicium.
Thin ribbons or curved sections; epidermis deep lemon yellow, ruggedly glandular......Limon Cortex.
Long, somewhat triangular pods wrinkled and leathery, containing numerous minute black seeds......Vanilla.

II.—BITTER.

- Deprived of rind; yellowish white, very light and spongy; intensely bitter.**.....Colocynthis.

III.—SWEET.

- Long cylindrical, blackish-brown pods divided into transverse cells, each containing a reddish-brown seed imbedded in a sweet pulp.**.....Cassia Pistula.
Flattened, compressed; covered with an efflorescence of sugar......Ficus.
Dark purple berry, berry-like fruits in masses......Rhus.
Oblong, shriveled; blackish blue, covered with a grayish bloom......Prunum.
Reddish-brown, fibrous masses containing brown, somewhat quadrangular seeds, enclosed in a tough membrane......Tamarindus.

IV.—ACIDULOUS.

- Flattened-globular; dark red; densely hairy.**.....Rhus Glabra.
Hemispherical, composed of small drupes; red finely hairy; used in fresh state......Rhus Idaeus.

SEEDS.

The seed may be defined as a fully developed ovule invested with one or two coverings (Integuments) enclosing the embryo. The outer integument is called the testa, and the inner one the tegmen. In many seeds these two integuments are coherent with the kernel. It is important that the student should consult a botanical work and familiarize himself with the essential parts of the seed. He should examine also such seeds as the bean, pea, the pumpkin, the almond, physostigma and nux vomica with reference to the surface markings, the position of the hilum, the micropyle and the raphe. The texture of seeds is variable, according as they are amy-laceous, albuminous, oily, etc. Sometimes they are brittle, but usually one or all of the parts are horny.

SYNOPSIS OF SEEDS.

I.—AROMATIC.

- Roundish or oval with longitudinal, worm-like furrows; light grayish brown covered with a white powder.**.....Myristica.

II.—BITTER.

- Flattish orbs, grayish or grayish-green, covered with fine silky, appressed hairs.**.....Nux Vomica.
Oblong-lanceolate; grayish green, with silky hairs......Strophanthus.
Triangular or tetrahedral; reticulated; brown-gray......Strobilagra.
Flattened-ovate with parallel longitudinal veins, brown......Amygdala Amara.

III.—ACRID.

- Small, globular; taste pungent; black.**.....Sinapis Nigra.

- Larger than black mustard; yellowish; taste pungent.**.....Sinapis Alba.
Subglobular, very hard; dull reddish brown......Colchici Semen.

IV.—MUCILAGINOUS OR OILY.

- Flattish-ovate; smooth, glossy brown.**.....Linum.
Similar to bitter almond, but slightly larger and with a bland taste......Amygdala Dulcis.
Flat, broadly ovate, with a shallow groove and flat ridge around margin; white......Pepo.
Reniform, flattened; dull brown-black, wrinkled......Stramonii Semen.
Chocolate brown; somewhat reniform, with deep black groove around the convex side, bordered by reddish ridges; taste, bean-like......Physostigma.

ACCESSORY PARTS OR APPENDAGES.

There are four subdivisions of this group, including the one excrescence (gall), an arilode (mace), the capillaceous and filamentous substances (gossypium and kamala), the pollenaceous and pulverulent substances (lycopodium, lupulin, and amylum). These are distinguished by such characteristics as follows:

I.—EXCRESCENCE.

- Astringent, globular, tuberculated above and with a short stipe below.**.....Galla.

II.—ARILLODE.

- Long, linear branched lobes on one side of a narrow entire band; brownish-orange; odor and taste nutmeg-like.**.....Macis.

III.—CAPILLACEOUS.

- Soft, white curling hairs from the seed.**.....Gossypium.
Glandular, brick-red powder, consisting of glands and hairs from the capsules......Kamala.
(Crocus, saffron, tea, corn silk: see above.)

IV.—POLLENACEOUS AND PULVERULENT SUBSTANCES.

- Fine, pale yellow, very mobile powder.**.....Lycopodium.
Minute yellowish-brown granules, resinous, bitter and aromatic......Lupulinum.
Fine white powder, sometimes cohering in irregular angular or columnar masses; odorless and tasteless......Amylum.

DRUGS WITHOUT CELLULAR STRUCTURE.

In this smaller group of official drugs we have a class which is not so tangible from the standpoint of physical characteristics. The products belonging to this class are usually devoid of many of those characteristics, such as shape, texture, etc., by which the pharmacognosist may readily identify individuals as in other groups. As it is the purpose of these lectures to dwell only upon the principals, and as our remarks were intended to partake of hints rather than full statements, it is deemed best to condense these no less important articles but, from our standpoint, less conspicuous drugs. In the first subdivision, the extracts and concrete juices, we have a few very important drugs, the characteristics of which the student should study thoroughly from the pharmacopœia or rather text-books.

CLASSIFICATION.

EXTRACTS AND CONCRETE JUICES.

- I.—Wholly or partly soluble in water and alcohol.**
(a) Taste bitter.
Reddish-brown, mottled, globular or cylindrical cakes of the bruised and broken seeds......Guarana.
Chestnut-brown masses with adhering leaf fragments; plastic; coarsely granular, odor heavy, narcotic......Opium.
Dull reddish-brown, angular pieces; odor characteristic, disagreeable......Lactucarium.
Dull or glossy brown; odor saffron like when breathed upon; taste very bitter and nauseous......Aloe.
(b) Taste, sweet.
Cylindrical brown-black sticks, breaking with a glossy conchoidal fracture, and yielding a brown powder......Extractum Glycyrrhizæ.
(c) Taste, Astringent and Sweetish.
Irregular, dark-brown masses, breaking with a shining conchoidal fracture......Catechu.
Small angular pieces, dark brown-red, shining, adheres to teeth when chewed......Kino.
II.—Insoluble in water and Alcohol.
Smoky; blackish-gray, very elastic, odor peculiar......Elastica.

SACCHARINE SUBSTANCES.

- Sugars.**
I.—Solid—Saccharum, Manna, Saccharum Lactis.
II.—Liquid—Mel.

MUCILAGINOUS AND RESINOUS SUBSTANCES.

- Gums.**
Acacia, Tragacanth.

Gum Resins.

- I.—Containing Volatile Oil—Asafoetida, Ammoniacum, Myrrha.**

II.—Free from Volatile Oil—Camhogia, Scammonium.

Pure Resins.

I.—Free from benzoic and cinnamic acids—Mastiche, Gualaca, Resina.

II.—Containing benzoic or cinnamic acids—Benzoinum, Resina.

Oleoresins.

I.—Free from benzoic or cinnamic acids—Copaiba, Terebinthina canadensis, Terebinthina, Pix Burgundica, Pix Liquida.

Balsams.

I.—Containing benzoic or cinnamic acid—Balsamum Peruvianum, Balsamum Tolutanum, Styrax.

VOLATILE OILS FROM VARIOUS PARTS OF THE PLANT: (SEE PHARMACOPEIA.)

S' COPTENS OR CAMPHORS.

Aromatic—Camphora Thymol, Menthol.
FATTY SUBSTANCES.

Liquid.

Oleum Amygdalæ Expressum, Oleum Lini, Oleum Ricini, Oleum Tiglli, Oleum Gossypii Seminis, Oleum Olivæ, Oleum Morrhuæ, Oleum Adipis.

Solid.

Oleum Theobromatis, Adeps, Adeps Lane Hydro-sus, Sebum, Cetaceum, Cera Alba, Cera Flava.

DRUGS OF ANIMAL ORIGIN.

I—Animals.

Cantharis, Coccus.

II Animal Tissues and Secretions

Tethyocolla, vitellus, moschus, fel bovis, fel bovis purificatum, acidum lacticum, pepsinum, pancreatinum.

See also fatty substances: Oleum morrhue, Cetaceum, Cera Flava, Cera Alba, Sebum, Adeps, Oleum Adipis, Adeps Lane Hydro-sus.

See also saccharine substances:

Mel, Saccharum Lactis.

CONCLUSION.

In the above presentation of pharmacognosy an effort has been made in a few words to cover a wide field. The aim has been to concentrate as much as possible, and at the same time to give abundant variety—a little plot of ground thickly sown, as it were. So much space, however, has been occupied by this subject that only a very few words now can be said to the student of the course, which should not be omitted. To the beginners the chief difficulties in the study of pharmacognosy are the terminology, the determination and discrimination of individual drugs and their varieties. Whenever two varieties of the same drugs differ from each other they are to be distinguished as if they were different drugs, as they are in fact, as in the case of *Viburnum opulus* and *V. prunifolium*, in the several varieties of ginger, cinnamon, sarsaparilla, catechu, cinchona, senna, etc. The second is a difficulty which taxes the power of observation, which as before stated, needs special cultivation, but as in all things else to the uninitiated the difficulty is very much magnified. As a most valuable means of fixing in the mind external characteristics it is suggested that the student provide himself with typical specimens of prominent drugs and endeavor to represent them upon paper by a more or less careful drawing. Presented below are three examples—Figs. 5, 6 and 7. These are selected from among the roots, and their prominent markings are brought out. To this small number a great many may be added and practised upon.

Because of the growth of our various methods of classification in this department of pharmaceutical science, a means of studying and comprehending the many forms and varieties of drugs becomes comparatively simple. The above treatment provides a skeleton, as it were, which the student is expected to build upon, to amplify and elucidate. The important points in self-examination should be the place the drug under consideration occupies in the system, and a physical description which will identify it. The student is expected to use the Pharmacopœia in filling out the descriptions, and to provide the common names in synonyms, which are in very many places intentionally omitted.

NOTE TO ERA STUDENTS.—No question blank will be issued for this lecture, but the subject will be considered in the questions issued on examination.

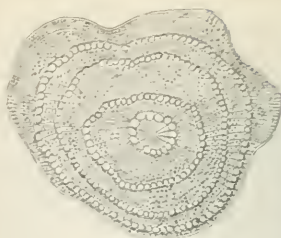


Fig. 5.—Cross section of pareira, showing the concentric circles of radiating wood-wedges.

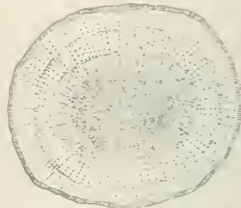


Fig. 6.—Cross section of calum, showing the radiate wood-bundles in the outer portion near the cuticular line.



Fig. 7.—Ayahuha, showing the peculiar annulations of the bark.

IMPORTANT TO STUDENTS OF THE ERA COURSE.

In view of the fact that spring brings with it many increased duties for the average pharmacist, and thereby greatly curtails his hours for study, it has been thought advisable by the management of the Era Course to lessen the number of recitations required from students. For this reason, therefore, all Era students who feel themselves pressed for time will be excused from further recitation upon the subjects of Botany and Pharmacognosy, without affecting their final grade. The recitations upon other subjects of the course will continue as heretofore.

All students should aim to recite upon at least three-fourths of the lectures, for which recitation blanks are issued, and all recitations for the junior year should be in the hands of the quiz master within ten days after the publication of the last lecture.

A NEW REMEDY FOR SYPHILIS has been discovered by Lalande. It is a product of reaction between sodium chloride and organic matter rich in keratin. For its preparation Lalande uses the partially developed horns of calves, as they contain large quantities of keratin. The horny substance is powdered immediately after killing the animal, and macerated with a solution of sodium chloride (powder 6 p., salt 1 p., water 100 p.) for 30 days at 25 to 30 °C., with occasional shaking. The insoluble matter is then allowed to settle during 4 months in a dark place, the clear solution drawn off and heated in a tightly closed vessel at 90 °C. for one-half hour. After cooling, the solution is ready for use. It has a yellow color and contains per liter: Glue 5.3 Gm.; sodium chloride 8.37 Gm., calcium phosphate 0.3 Gm.; calcium sulphate 0.03 Gm., potassium sulphate traces. The remedy is used hypodermically and has given such encouraging results during 2 years of practice as to justify its publication. Improvement is noticeable after the third injection. After 10 to 20 doses all symptoms cease and do not reappear on discontinuation of the remedy. Upon what properties the remedial action rests is not stated. (Ap. Ztg.)

(Special Correspondence.)

ANCIENT DRUG-POTS.

The word "Majolica" is generally admitted to be a corruption of Majorica, for the earthenware industry first flourished in the Balearic Isles, in the days when the Moor reigned over Spain. Many of the handsome metallic lusted

HISPANO-MORESQUE JARS

were doubtless used by the Moorish druggists of the Middle Ages, but the absence of inscriptions leaves us in uncertainty. The jar shown in Fig. 1 was discovered in an ancient pharmacy at Narbonne, a French town near the



Fig. 1.

Fig. 3.

Spanish frontier, and was probably made by an Oriental potter of the 16th century. The close resemblance of shape between this specimen and the Italian "Albarelli" in Fig. 2 will be noted. In fact, so many Spanish jars were imported to Italy during the XIVth and XVth centuries, that the products of the two countries were confounded until a recent epoch.

THE ITALIAN RENAISSANCE DRUG-POTS

are unmistakable, bearing as they do the names of the remedies popular 300 and 400 years ago. Often of large



Fig. 2.

size and much artistic merit, they are conspicuous alike in the leading museums of England and France. The two jars in Fig. 2 (Cluny Museum, Paris) are from Faenza, the little Italian town where pottery has been made since A. D. 1500; the French word "Faïence" would seem to be a corruption of this word, by the way. In the British Museum, London, may be seen a handsome blue and white jar some 380 years old, on which the inscription "Syrup of Fumatory" is surmounted by the portrait of Savanorola, the famous Italian monk. Other specimens

at South Kensington, bear inscriptions "JULEP OXYMEL," "SY. DI PAPAVERI," etc.; the former shows us a Saracen and a knight in combat.

But it was in the little Duchy of

URBINO

that Italian ceramic art reached its highest artistic level. Urbino was Raphael's town, and it was long supposed that the great artist actually worked in one of the potteries there. It is, however, pretty well established that his pupils did so, among others Francesco Xanto, as mentioned in Longfellow's "Keramos."

Few drug-pots were made at Pesaro and Gubbio, but Castel Durante and Urbino seem to have made a specialty of this branch. The vases made at Castel-Durante for the pharmacy of the Loretto monastery, and the jars executed by Orazio Fontana for the Spezieria of the Ducal Palace of Guid' Ubaldo II. are cited by high authorities as masterpieces of ceramic art.

Decorated in various styles, yellow and blue predominating, the larger and more ambitious specimens of Castel Durante ware are usually ornamented with scenes from Scriptural or mythological history. In Fig. 3 the female figure on the dolphin probably pictures the birth of Venus—daughter of the sea-foam. "ERMODATILI" is the inscription round the base. The "RADIX APPII" jar at the British Museum shows us a female captive before a king's tent,—Alexander and the wife of Darius. Close by a jar dated 1580 bears a coat of arms and the inscription



Fig. 4.

"Liperia Folia," and a third for powdered cummin "CUMINO PESTO" is half a century older. The "UNG. EGYPTIACUM" pot at Cluny is embellished with a primitive portrait of Esculapius and his serpent. Mustard, white poppies, various electuaries, etc., etc., may be noted among other inscriptions.

DECORATIONS OF PLANTS

were of course numerous. There is a remarkable collection at the Louvre (Paris) of these water bottles. The "AQUA FENICOLLI" recipient represents Atlas bearing the world upon his shoulders, doubtless to illustrate the virtues of the plant that "gave new strength and courage rude." A goddess,—probably Ceres,—with her cornucopia, adorns the "Celadon-water" flask. And,—just to illustrate the remedies popular about the days of Columbus,—one may cite, A. BUGLOSSA, BORAGINI, BETONICE, CAMOMILA, CAPILLO, EUFRAGA, FUMOTERRA, MATRICA, SOLANI, SCOLOPEIRIA and SCABIOSA.

The "Scudella" or accouchement cup, in the Salting loan collection at South Kensington, is attributed to the famous Xanto. These little earthenware boxes bear charmingly naive representations of the various preparations for the arrival of the "little stranger";—the nurse, the swaddling bands, the bath, etc., etc.

LATER ITALIAN WORK

is often interesting. Two large vases at the Cluny Museum bear really remarkable illustrations of the miracle of the loaves and fishes, and Esther before Ahasuerus, with inscriptions AQU: RUTH: CAPRARE, etc.

Fig. 5 is one of a series made about 1700, doubtless for the hospital of St. Martin, for the French warrior saint is skillfully dividing his cloak with his sword for the benefit of the waiting beggar, regardless of the prancing of his steed, which renders such a feat somewhat difficult. AQU: RORIS: MARIN. AQU: ROS.: RUB, etc., are the inscriptions.

Italy was, undoubtedly, the great centre for the manufacture of drugware. In the British Museum the only

English specimens are in blue and white

LAMBEIH DELFT

and are inscribed "IT34 S. BALSAMIC", "FUSSILAGI R. T. 1660", "ANTHOS 1652", "MARTIATU TW 1680", "ABSINTIE T. G. 1683." There are a few Swedish vessels at Sévres Museum, as well as French and Spanish work. The sight of this latter suggests the query

HAS AMERICA NO RELICS.

of this kind? One would think that in the monasteries of the old Spanish States the curio-hunter could find



Fig. 5.

samples of Spanish or Italian ware, for the convents were usually the best customers for pharmaceutical pottery.

FROM THE PHYSICIAN'S VIEW-POINT.*

By GILBERT G. COTTAM, M. D.

Judging from the standpoint of one in a position to inquire into both sides of the question, it has long seemed to the writer that the inability of certain druggists to secure the support of the physicians lies largely in a misunderstanding of the latter's needs, rather than in the inability to cater to them. It is the purpose of this paper to furnish a few practical suggestions making these needs clearer, although the impossibility of laying down hard and fast rules which will fit every case must plainly be seen.

To begin with, physicians, like drugs, vary widely in quality. Some you want and some you do not. Among the latter are those of notoriously intemperate habits or whose clientele is composed of an undesirable class. These are to be avoided. Any active connection they may have with a drug store is certain to prove detrimental. One can be neutral with these men without incurring their enmity.

Good Service the Prime Requisite.

The conscientious druggist will have no difficulty in securing the co-operation of the better class of physicians. Good service is the prime requisite, and the way in which this is rendered must be governed by the circumstances in each individual case. A plain, business-like talk will often accomplish much towards establishing the desired relations, since all doctors have their idiosyncrasies—"hobbies," if you will. It may be that your doctor has a particular fondness for a certain line of fluid extracts or a special make of pills or tablet triturates. He abhors substitution, even to putting in one maker's product for another's when the latter's is specified in the prescription, and it helps matters if he

knows that the druggist is willing to keep in stock the kind he prefers. As a matter of fact, however, most physicians but rarely specify, being satisfied in the majority of instances if a standard preparation by a respectable firm is provided. If you are yourself skilled in getting up pharmaceuticals, tell the doctor about them and submit samples to him for inspection and trial. If you win his respect for your own goods, and get him to prescribe them, well and good; but don't dispense them when he calls for those of some manufacturer.

While discussing these matters with him, give your physician an opportunity to state what concessions he expects for sending you his business. It is usual in most places to furnish him case medicines without charge, with the understanding that these are to tide over an emergency until a prescription can be filled. The latter clause is a desirable one, since some physicians are rather too liberal with the drugs they get for nothing. Prescription blanks are always furnished by the druggist. Chloroform, ether, cotton, lamb's wool, bichloride tablets and other office supplies are usually supplied at a bit above cost. The practice of giving physicians a percentage on the prescriptions they send to the druggist is a poor inducement and should be abolished. It is a bad precedent to establish.

A Wise Suggestion.

Physicians are always glad to be relieved of making urinalyses, and where time can be found, the druggist will find it advantageous to cultivate the "knack" of doing these with accuracy and despatch. The apparatus is both simple and inexpensive, and the chemicals can be found in the regular stock of any drug store. It is well to have a corner set apart for this work, with solutions and apparatus ready for use at a moment's notice. With a reasonable fixed fee for each examination, this trifling outlay of time and money can be made to yield appreciable returns in time, in addition to affording an agreeable diversion from the routine of drug store work. Besides, the mere fact of being competent in work of this kind will enhance the druggist's reputation among physicians generally, and be the means of obtaining other business which in the natural order of things would drift into different channels.

Concerning Prescription Matters.

As regards prescriptions, several points demand attention. Shall they be refilled without consulting the physician in each instance? This question is an old one which has never been satisfactorily solved. It is desirable to have an understanding in regard to this, for there appears to be a wide difference of opinion among physicians. Some would have the question answered negatively, while others are indifferent about the matter.

Patients are quick to detect slight differences when prescriptions are refilled, and will not infrequently go to their medicine man with a bottle three-fourths filled, complaining that the druggist has made a mistake—that the new medicine does not taste anything like the old, has not the desired effect, etc. &c. course, in the vast majority of instances, it is due to an immaterial difference but it places everybody concerned in an awkward position, and a naturally suspicious public is very chary of explanations. Great care should be exercised in the preparation of simple elixirs and other vehicles, for it is the variation of these which affects "refills," and makes the customer want to get his prescriptions filled elsewhere in the future. Elixir of lactated pepsin is a vehicle quite often used, and, being made by several firms, the product of one house differs quite noticeably from that of another. It is well, therefore, to pin one's faith to one standard make in order to avoid the difficulty just pointed out. So it is with cascara and a number of other preparations in constant use, and which in prescription work are especially likely to be needed for refilling when once prescribed. These matters are mentioned in this connection for the simple reason that a physician who is desirous of sending all of his prescriptions to a certain druggist is hampered by such complaints as these, and his confidence is bound to be shaken in the long run if they persist, innocent though the cause may be.

A prescription is a confidential communication and must always be treated as such. If a mistake is noted, such as an incompatibility or an excessive dose, the prescriber's attention should be drawn to the matter

* Reprinted from Bulletin of Pharmacy.

without the patient's knowledge. Anything within the control of the druggist which tends to upset the professional relations between physician and patient naturally tends to prejudice the former, and interferes with the amicable relations which should exist between him and the druggist.

The Keynote of the Situation.

The key-note of the whole situation is this: The interests of the physician and the druggist are practically identical, and reciprocity is the course of conduct by which they may be best subserved. The physician supports the druggist's interests by directing his patient thither, and by protecting him from criticism as far as lies within his power; the druggist reciprocates in the manner which this paper has endeavored to set forth. Let each work for the welfare of the other, and the efforts of both will be crowned with success.

CAOUTCHOUC AND INDIA-RUBBER CEMENTS.

The Bayerische Industrie Gewerbeblatt gives the following useful formulas (which National Druggist translates), for this class of cements, which are daily coming into more universal demand, with the spread of the bicycle and other rubber tired vehicles, rubber garments and the varied applications in domestic affairs, to which such cements are suited.

Cement for Leather and Gutta-Percha.

Melt together 100 parts of gutta-percha, 100 parts of asphaltum (or coal-tar pitch), and 15 parts of oil of turpentine. Apply hot.

Cement for Leather to Leather.

This is admirably designed for repairing shoes ("invisible patches"), attaching soles that have become "started," etc., as it is elastic, and thus, to a certain extent, permits of motion in the joint without fracture of the line of union. Its formula is as follows:

Dissolve 10 parts of gutta-percha in 100 parts of benzol, pour the solution into 100 parts of linseed-oil varnish, and stir until a homogeneous mixture is obtained.

To make a firm and nicely appearing job, the patch should be chamfered down at the edges with a keen knife, and the shoe leather trimmed away around the break, so as to present a clean, fresh surface to the cement. A little practice will soon make one expert at this work. To give a boot that has thus been treated a brilliant polish, the author recommends the following:

Leather Polish.

Casein	quantum sufficit
Borax	quantum sufficit
Boiling water.....	quantum sufficit

Dissolve the borax in boiling water, and to the solution add as much freshly precipitated casein as it will dissolve, maintaining the heat in the meantime. Nigrosin, or bone-black, or both, may be added, if desirable. In case ordinary bone-black is used, the addition of a little indigo or prussian blue intensifies the blackness. If bone-black purified be used, this addition will be unnecessary).

Rubber, Vulcanized Material, Etc., to Metals.

Add 1 part of coarsely powdered shellac to 10 parts of strongest liquor ammoniac, and set aside in a well stoppered vessel until complete solution, which occurs in from three to four weeks, according to the temperature at which the vessel is kept. This is used cold, a layer being applied to each surface, and the parts left until a portion of the solvent has evaporated, then join and apply weight or compression. The joint thus made is water and gas proof. It may be used for joining vulcanized rubber, hard or soft, to almost any and every other material—glass, metals, etc.

Bicycle Cement.

For wheels tired with rubber tubing the foregoing cement answers every purpose. Leather tiring is, however, best repaired with the following:

Carbon disulphide.....	19 parts
Oil of turpentine.....	1 part
Gutta-percha, cut in small pieces, q. s.	

Mix the turpentine and carbon disulphide, and add sufficient gutta-percha, under frequent agitations, or rubbing up, until a thick paste is obtained. To make a good joint all fatty and greasy matter must be got rid of,

and the surface of the leather freshened, either by the use of a rasp, emery paper or knife, before applying the paste.

Caoutchouc.

Caoutchouc, cut in fine pieces.....	100 parts
Rosin	15 parts
Shellac	10 parts
Carbon disulphide, q. s., to dissolve	

Mix and make a solution—

Caoutchouc	1 part
Mastic	7 parts
Chloroform	50 parts

Mix and let stand until dissolved (which will require several weeks).

Cement for Mending Gum Shoes.

Caoutchouc.....	62 parts
Chloroform.....	250 parts

Mix and dissolve. Then take

Caoutchouc.....	60 parts
Rosin.....	24 parts
Oil of turpentine.....	250 parts

Mix and dissolve. When complete solution has taken place in both cases, mix the two solutions and agitate until homogeneous. Use cold, and apply a portion of the cement to each surface to be joined.

PRODUCTION OF GINSENG IN THE NORTHERN PORTION OF KOREA.*

The chief industry of Sogdo is the production of ginseng, a plant which is so highly esteemed as a tonic by both Chinese and Japanese, as well as by the Koreans themselves. The country in the immediate vicinity of the city is given up almost entirely to its cultivation. The seedlings are planted in rows in raised beds, and are covered from wind and rain by a reed that climbs some 3 feet in height. During the earlier stages of its growth, the plant requires to be frequently transplanted, and it requires from six to seven years to reach maturity. The ginseng gardens, which are from one to two acres in extent, are carefully fenced in, and in the center an elevated mat shed is raised for the watchman, who has to observe particular precautions as the plant reaches the latter and more valuable stages of its growth.

The so-called "red" ginseng, which is only made at Sogdo, is especially prepared for the foreign market. The roots of the plant are placed in wicker baskets, which are enclosed in earthenware pots with holes in the bottom, and then set over boiling water and steamed for a period of from one to four hours, according to the age of the plant. It takes about two catties (one catty 1-3 pounds), of the "white" or natural ginseng to make one catty of the clarified. The "white" ginseng is grown at various other places in the peninsula, and is largely consumed by the Koreans, who have the greatest faith in it as a cure for all forms of disease. It is generally consumed by them in the form of broth. The roots having been stewed, the Korean epicure wraps a napkin around them, squeezes it dry and proceeds to drink up the juice. Quinine has, however, recently been largely introduced into the country, more especially by certain missionary bodies, who have a custom of rewarding the native disseminators of their religious literature by supplying them with this drug at cost price, and thus enabling them to subsist on the profits of its sale. The drug, to which equally magical properties are gradually being attributed, has already to a large extent superseded the use of ginseng among the natives.

Up to 1894, the proceeds of the taxation of "red" ginseng—the "white," as far as I am aware, pays no duties—formed a portion of the Royal revenue; but the king at that time gave up this perquisite, as well as others, in exchange for a regular civil list, and the collection of the ginseng dues is now under the control of the foreign maritime customs. A license is still required by the grower, and the annual production is limited to 15,000 catties. It pays export duties at the rate of cent. per cent. ad valorem, this varying from about \$16 to \$17 per catty, the value of the ginseng being in proportion to the smallness of the number of the roots taken to make up the catty. The most expensive runs about six or seven sticks to the catty, while the average amount of duty on this quantity is reckoned at \$10.

*Extract from report of R. Willis, of the British Consulate-General at Seoul, Korea, published in Consular Reports.

(Special Correspondence.)

SOME FRENCH SENATORS.

Paris, April 8, 1898.

Pharmacists and Chemists.

M. César Duval, the new Senator for the Haute-Savoie Department, is a well-known face at Parisian pharmaceutical dinners and gatherings.

He was born in 1811 at St. Julien-en-Genevois, a small town in the department which he now represents, and after taking his diploma as "first class pharmacist," set up in business there in 1839. A year after, war broke out, and he quitted the dispensing counter to follow Garibaldi to the battles around Dijon, acting as "aide-major" (army surgeon), to the Third Légion des Mutilés, whose struggles and adventures he has recorded in an interesting little work.

Peace soon left him free to follow his profession, and 1883 found him still exercising in his St. Julien pharmacy—he had been elected Mayor of the town in 1881. The death of the member for St. Julien induced him to enter political life, and his fellow citizens elected him to represent them in the Chamber of Deputies in 1883. Since then he has of course been obliged to reside in Paris. Re-elected in 1888 and in 1902, he was named President of the Committee appointed to study and report upon the new Pharmacy Law. It is much to be regretted that the approaching dissolution of the French Chamber will probably find this useful measure still unvoted.

The change from the heated Chamber of Deputies to the comparative calm of the Senate will enable M. Duval, while continuing to uphold the interests of the profession, to devote more time to his literary hobbies, the principal of which is the history of his native country. He also takes part in the proceedings of various local scientific gatherings, and is a member of the Geneva National Institute.

Pharmacists, unfortunately, have seldom at their command the leisure or the means necessary to enter the political arena. Although the Senate contains over thirty

M. D.'s and probably twice as many lawyers, M. Duval is the only veritable pharmacist. This lack of representation, of course, tells against them when pharmacy legislation comes under discussion. There are, however, several Senators of eminence connected with the drug and chemical trade.



César Duval.

was much before the public about the time of the 1889 exhibition, when he (as Minister of Finances in the Floquet Cabinet), proposed a scheme for the more equitable and just distribution of the burden of taxation. This was outvoted by the Parliament. He was re-elected at the general elections, and in 1893 was again Finance Minister for six months; the year following he left the lower House for the Senate.

The name of

Senator Poirrier

was mentioned in the jury list of the Chemistry and Pharmacy section of the 1900 exhibition, while Senator Léon Chris is on the perfumery section jury.

The name of

M. Scheurer-Kestner

will be familiar to all who have followed the recent agitation in France. His connection with the manufacture of chemicals is of long standing. Born in 1838, when Mulhouse (Alsace) was French soil, he studied chemistry at Paris, and returning home, married the daughter of M. Kestner, and acted as manager in the extensive chemi-

cal works owned by his father-in-law at Thann, Alsace. Even at an early age he had courage enough to assert his convictions and was sentenced in 1862 by the French Imperial authorities to four months' imprisonment or a 8000 fine for "propagating Republican ideas." In the same year he published a work on the principles of the "chemical theory of types as applied to organic combinations." In 1868 the Mulhouse Chemical Society awarded him a gold medal for an essay on "Combustion."

The death of his father-in-law in 1870, left the chemical business in his hands, and he still retains a large interest in this undertaking. During the war he was appointed director of the Government pyrotechnic establishment at Cetta, on the Mediterranean.

Elected in 1871 Deputy for the Haut-Rhin, he was practically the last Alsatian representative that sat in a French Parliament. At Bordeaux he naturally voted against the terms of peace which ceded his native province



Scheurer-Kestner.

to the German Empire, and he resisted his seat as a protest. In July, 1871, Paris elected him Senator; in 1875 this title was confirmed to him for life. He was subsequently chosen by the Senate as one of their vice-presidents; was editor of a Parisian daily from 1879 to 1894, and has been chairman of the Chemical Society of Paris.

Such is the record of the somewhat retiring man whose expression of his belief in the innocence of Dreyfus has forced him into notoriety, and raised a clamor such as is rarely heard even in Paris. One thing seems certain, that his conviction, however founded, is sincere, and his attitude dignified. If not so convincing as his friends might wish,

Zola's "Paris"

is emphatically the "book of the month." Guillaume Froment, the chemist who is one of the two "heroes" of the tale, is a composite, if not a fictitious character, but the majority of those who figure in the work are well known to Parisians. Among the characters "drawn from life," the chemist, "Bertheroy," will be readily recognized by all who have met

Senator Berthelot

"One of the greatest glories of France, to whom chemistry owed the extraordinary progress which has made her the mother science, now changing the face of the earth," says Zola. "Member of the Institute, loaded with posts and with honors.....A septuagenarian, he was tall and spare, with angular features.....By no means striking, he looked like an aged herbalist. But the forehead was noble, broad and smooth, and under the fluffy, white hair, the fiery eyes still beamed brightly."

"Bertheroy's" discourses on science and progress, explosives and social reform, are too long to quote here. The book is likely to be the more widely read abroad, as it is comparatively free from passages of the kind which so often prevent Zola's prose from being unreservedly appreciated.

NOTE ON "TFOU" (Soapstone of the Arabs), and on a Method for Emulsifying Heavy Tar Oils.—Lahache, (in Journ. Pharm. Chim., Jour. Soc. Ind.) says that the mineral soap used in Algeria and Tunis, "TfoU," is somewhat waxy and unctuous to the touch, varies in color from red to grey and white, and in composition. It is composed of silicates of the alkalis and alkaline earths, calcium carbonate, free gelatinous silica, clay, and in small quantities, sulphates and chlorides of the alkalis and alkaline earths. This soapstone when finely powdered, absorbs five times its weight of heavy tar oil, and from the paste obtained, water does not separate the oil, but on agitation with water an emulsion is formed. It is proposed to use the emulsion as a disinfectant.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, MAY 5, 1898.

No. 18.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates:
U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483,
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 124 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL..... 655	Provisions, Text, etc..... 673
Seeing at a Distance..... 658	What the Trade Think..... 674
French Pharmacy Law	How War Affects the Drug
Modified..... 658	Trade..... 676
ERA COURSE IN PHAR-	Druggists in the National
MACY..... 659	Guard..... 677
Inorganic Chemistry..... 659	Defeat of Shorter Hours
Pharmaceutical Processes..... 659	Bill; Obnoxious Poison
Great Britain's New Phar-	Bill Killed; Died from
macopoeia..... 655	Natural Causes..... 679
Pharmacy in Nova Scotia..... 666	NEWS LETTERS..... 679
Compressed Tablets and	New York College Com-
Tablet Triturates..... 667	mencement..... 687
Substitution: Wish It	College and Board News..... 688
Were So..... 668	DRUGGISTS' ADVERTIS-
Poisons and Poisoners..... 669	ING..... 689
PHARMACY..... 670	OBITUARY..... 692
QUESTION BOX..... 671	New Books..... 692
NEWS AND TRADE DE-	PATENTS..... 692
PARTMENT..... 673	STATE OF TRADE..... 693
The War Revenue Bill; Its	MARKET REPORTS..... 694

NEW EDITION, ERA DRUGGISTS DIRECTORY.

The sixth edition of the Era Druggists Directory, now in press, is the only directory of the drug trade of the United States and Canada, and its contents are divided into three parts, as follows:

Wholesalers, about 300 names; Retailers, about 37,000 names; and Manufacturers and others who supply the drug trade, about 6,000 names. These names, in their several departments, are arranged alphabetically by States and towns, and in cities the street addresses are given.

The new edition will show that about 5,000 changes have occurred in firms or their locations since the publication of the fifth edition, about one year ago, and all firms having correspondence with the trade will find it an economy of time and money to possess the latest edition, with its corrected lists.

The price of the book is \$5.00 per copy delivered, and as the size of the edition printed is governed by the number of advance orders, those who have not already placed their orders should do so at once. Address D. O. Haynes & Co., Box 1483, New York.

The Patent Medicine Tax.

Of paramount importance and interest to the drug trade just now is the bill introduced into Congress under the title "To Provide Ways and Means to Meet War Expenditures." It naturally appeals to our patriotism, for as a whole it is a measure on which the nation must depend in large part for funds with which to prosecute the war in which we are now engaged.

We print elsewhere in this issue those portions of the bill which are of most direct concern to the drug trade, the proprietary medicine manufacturers in particular. The general sentiment of the several branches of the trade are expressed in the interviews reported. It will be seen that in a general way the bill meets the approbation of manufacturers, jobbers and retailers, who all admit the justice and desirability of the revenue tax. But there is considerable difference of opinion regarding the manner in which the provisions of the bill shall be put into effect, and it is shown quite plainly that some hardship is sure to be imposed where not anticipated nor intended.

In principle the bill is very commendable indeed, from the fact that it levies a tax only upon what Mr. Dingley calls "articles of voluntary consumption," meaning, thereby, that the consumer pays no tax unless he is perfectly willing to do so. Proprietary medicine manufacturers are allowed the privilege of furnishing to the Government their own dies or designs for stamps to be used on their preparations. Not a few manufacturers are heartily pleased with this provision. It will act directly to prevent the counterfeiting of their goods, and inasmuch as the illegal use of these revenue stamps constitutes a very serious criminal offense, the Government will conduct and defray the expense of prosecuting offenders. The revenue stamp, therefore, acts really as a guarantee of genuineness of the article to which attached.

The point in which proprietors are most directly concerned, however, is whether the provisions of this bill apply to the so-called non-secret medicines equally with their own productions. Very careful reading of the bill would seem to show that the preparations now marketed as non-secrets, if continued to be put up in their present form, will be most certainly subject to the tax. The bill provides that all medicinal compounds put up in a manner similar to proprietary medicines, or which in any way are recommended as curative agents, come within the restrictions. The proprietors hold that non-secrets differ from their own productions only in the manner of their introduction, and that they are to a certain extent recognized in medical practice. The proprietors believe that non-secret preparations hold for their owners all of the property rights which attach to patent medicines and their formulas, and, except as to a few active principles which may be present, are as rigorously guarded from public knowledge as are those of the most secret proprietaries.

But the construction of the law and its application to this or that article or variety of articles can safely be left to those upon whom the duty of its enforcement

rests. The trade is most interested in knowing how the stamping of the multitudinous variety of articles is to be carried out most effectively and economically. It is undeniable that much hardship will be worked because of the extra labor imposed upon dealers in stamping goods now in stock, and the question is asked, how can it be minimized? Must proprietors furnish stamps to place upon their goods held by the jobber, or are jobbers to affix the necessary stamps at their own expense? Proprietors have already received orders for goods to be filled only under condition that they guarantee protection against the tax. Just how these questions may best be answered remains to be seen. But the most feasible plan seems to be for the jobbers and smaller dealers to get together and decide upon some uniform method of action. It is true that the consumer will be made to pay the tax, but undoubtedly the expense of stamping the articles in stock at the time the law becomes operative must be borne by the dealer.

There is great diversity of opinion regarding the question of increase of price of these taxed articles. Some proprietors will undoubtedly revise their price lists to cover the added expense, and jobbers will likewise do so in their sales to dealers. When it comes to the retail druggist, his customers will have to pay a little more. The general effect will be that all proprietary articles will be slightly raised in price, and the question arises, why is it not feasible, inasmuch as some advance must be made, to very materially raise the prices, particularly upon all goods which have been subject to cutting practices, with a view to getting them back somewhere near to their advertised prices? There may be something in all this matter which will work toward the solution of the cut-rate problem.

The drug trade will devote its energies and its careful study to this question of tax on proprietary articles, etc., etc., which, while undoubtedly a burden, causing much confusion to established trade customs and not a little annoyance and much expense, will be borne cheerfully and without serious protest from the general feeling of patriotism which pervades all ranks of the business community.

War Times.

These are stirring times, and the stir is felt in every branch of commercial industry. But though war is upon us, all is optimism, enthusiasm, patriotism. There is none of that depressing effect which is the general result of a state of war. The nation's resources are sound, its credits and securities unaffected. The outcome of the war is not held in doubt by any one, indeed, the general feeling is that we shall win "hands down." The average business citizen is still thinking of his business, first. Of course he will go to fight Spaniards if he is actually needed, but he doesn't really think he will be needed. The American people have every confidence in Uncle Sam's ability to whip the Don, and whip him quickly and effectually.

Naturally, then, there has as yet been but little serious interruption to business, on the contrary many lines have been materially stimulated and strengthened. The manufacturers of clothing and equipment for our nation's defenders and those who trade in food supplies find themselves in a tremendous rush of business. So far we have not suffered, though of course there is some effect upon special lines of the existing unusual conditions. For instance, in brimstone and chlorate of potash, and other articles which are largely used in the production of ammunition, or and supplies of which come from abroad, or are gov-

erned or produced by Spain. There may be some scarcity of these, but for all our actual needs we can make what we want. Chlorate has doubled in price, because, being a component part of many explosives and fulminates, it is contraband of war and has been refused for carriage by British and foreign vessel owners. So, too, with sulphur, which has advanced materially, and is of exceedingly limited stock here: Spain has something to say about this.

However, the United States is a self-sustaining country and need not go outside her own resources. We may be inconvenienced temporarily, but it must not be forgotten that we have chlorate manufactories of our own, whole lakes of sulphur mud and enormous beds of brimstone, and Yankee ingenuity can be depended upon to keep our fighters' cartridge belts and warships' magazines well supplied.

The particulars in which the drug trade is as yet affected by the war are few. Besides the two advances noted, but three or four important staples, quinine, opium and a few others have materially quickened, though the main tendency of the market is upward. There are plenty of the Colonel Sellers strips of speculators who have discovered early future opportunities to get rich out of the drug market, and are holding on to certain stocks and endeavoring to corner this or that. But so far the general tone is healthy. The most perturbed individuals are the London operators; we are not worrying much.

The detailed market reports given weekly in this paper are authoritative reports of actual conditions and prospects, and can be depended upon for reliability. The drug market does not expect to be scared into a panicky condition just yet. Still these are stirring times, and Spain may not throw up the sponge so soon as some have said and many think she will.

Medical Ethics and Patent Medicines.

The difference between preaching and practice is often very startling; particularly is this so when the code of ethics of the medical fraternity is under observation. Medical journals profess the highest standard, but in practice there are some who fall. The entire medical press of this country has just been subjected to a test which has produced some interesting and instructive returns. The question of advertising proprietary medicines in the medical journals furnished this test. The manufacturer of a certain patent medicine prepared an advertisement of his preparation, and asked 119 journals if they would accept it, and if so on what conditions and at what price. The replies have been printed and make "mighty interesting reading." Twenty-nine said they would, 24 refused and 66 preferred to be sphinxes. Here are some of the replies.

"The questions you ask were a little startling to us, in view of the conservative attitude we have always assumed, so far as much advertising is concerned, but, after carefully reading your really clever announcement for — I personally can see no reason why a contract should not be accepted from you. I am not absolutely certain that the editors will regard the matter in the same light, but my impression is they will, and if you desire space I shall be pleased to receive a formal order from you."

"My position as editor of a strictly professional magazine is inconsistent with advertising any general cure or popular prescription. My own medical knowledge and principles of medicine forbid the belief that any prescription could be made up that ought to be recommended to patients in a general condition of any kind—much less in conditions of many kinds. Every one requires strict special application of both learning and skill, lest drugs should do harm instead of good."

"Although the Medical — goes to physicians, I see no particular objection to the copy which you propose and which I have read carefully. While I see no objection to it, I wish to say incidentally that it is very skillfully written, and I offer my congratulations to the writer. I would be willing to admit it in the advertising pages of the Medical —."

"We do not care to take the — ad under existing conditions. The reason is that the preparation is advertised direct to the public, thus conflicting with the interests of the medical profession, whom we represent. If the — Company desires to modify its plans to advertising and working through the profession, and will modify their ad to a more dignified and scientific tone, we will be happy to consider their application for space."

"To the inquiry: 'Will you insert the enclosed advertisement as written?' the answer is, 'No.' The subject matter is not objectionable. The ethical point is the character of advertisements in lay journals, making it a remedy for self-prescription."

"As long as the formula is furnished, I see no objection to putting it in the regular advertising columns of the Medical —."

"I cannot see the difference from an ethical standpoint between your way of pushing — and Scott & Bowne and others, who likewise use the secular press. You can have our indorsement. To the question, 'Will you insert the enclosed advertisement as written?' my answer is Yes. I can't see anything wrong with it." In a second letter the same correspondent writes: "I note great opposition is being worked up against admitting — to the medical press, but I want you to beat it out and get right in the medical camp, as — are quite as good as any of the proprietaries that have made fortunes by getting the indorsement of the 150,000 M. D.'s of this country. Please send a prompt acceptance, as I want to get in the field against certain hypocrites by hoisting the standard of —."

"We have indicated on the accompanying copy that portion of the — ad, which would scarcely be desirable in a high-class medical journal. With the exception herein indicated, we see no reason why — should not receive the indorsement of the advertising department of the medical press, especially if a point is made to mention the formula in every advertisement; this would bring it within the domain of proprietary medicine, as distinguished from patent and secret nostrums, which are excluded from advertising pages in the medical journals."

"Advertisement acceptable. I think that it would be advisable for you to publish the formula in the advertisement, and if you send us the order, we will give you a couple of little points about how to write this advertisement, that will make it much more acceptable to the medical journals and to the doctors. In fact, I think we could write an advertisement for you which would be a great deal better than the one which you have, for the people through the medical press, and overcome much of the prejudice which, of course, you understand, exists in the profession against patent medicines."

"We do not care to insert your advertisement of the proprietary remedy under any consideration. As this is our position, we do not feel that it is advisable for us to suggest any changes. We do not propose to knowingly take the advertisements of patent or proprietary medicines which have been originated by or for the laity, and which are advertised and sold directly to the laity, and on this ground, regardless of the composition of your mixture, we decline your advertisement."

"We do not advertise anything in the patent medicine line."

While there is a suspicion of a joke in this at the expense of the brethren of the medical press, the correspondence as published furnishes some edifying material upon the position of the medical press in exploiting proprietary medicines, which are sold to and are practically secret to the public, so far as

intelligent comprehension of formula is concerned. The bait of furnishing the physician with the formula in return for his commendation seems to be a good one, at least The Journal of the American Medical Association bites upon it by being one of the twenty-nine.

"Let Dogs Delight, Etc."

Our English cousins are popularly supposed to be rather phlegmatic in disposition, almost impossible to excite to pyrotechnic emotional display, but occasionally this reserve, which must be unnatural, is broken down, and the other extreme is reached. When they do shout, they shout vociferously, in volume and key quite surprising. This tendency to spasmodic emotional frenzy exists in the make-up of our pharmaceutical confreres, even our London drug trade journalists. Just at present the several pharmaceutical journals in London are stirred up to their deepest depths and highest heights by what seems a very trivial circumstance, namely, that they severally received review copies of the new British Pharmacopoeia on a Friday instead of Thursday, and consequently the publication of reviews had to be delayed a whole week. They are aggrieved that the distributors of the copies were not thoughtful enough to remember that Friday was Good Friday and a holiday, when good Britons do not work, not even write reviews or print drug papers. What makes the matter worse and occasions bitter revilings is that some medical journals got their copies on Thursday.

All this commotion seems to Americans funny rather than tragic, a veritable tempest in a teapot, but in this instance our brothers take their fun very seriously. It is fortunate, however, and has prevented much hair-pulling, that all the pharmaceutical journals were treated alike, and none was able to "scoop" its rivals. But at heart they all forgive their enemies and those who despitely use them, for each and every journal shows this beatific nature by printing, in the same issues with their querulous complaints, page after page of review, to an extent and with a thoroughness which would seem almost to render the later sale and distribution of the book itself entirely useless. We have a little review of our own in this issue which gives a fair idea of the changes which the past thirteen years of development and experience make necessary in the British official guidebook and standard.

Why Not?

The portrait of the Governor of Vermont appears in the published advertisements of a certain patent medicine. Upon the thoroughly rational presumption that the Governor was liberally paid for the use of his "phiz," one of the Vermont papers declares that the money received therefore ought to go into the State treasury. Quite so: we agree. This proposition is a new one, and opens a wide field for speculation. Clergymen "endorasers" could be used to raise funds for their churches (instead of pocketing the cash), and it would not be a bad idea to work 'em hard in this direction. There could be different grades of testimonials, say for the "organ fund," the "missionary box," "pastor's salary," and all that, on a carefully graduated scale of prices, and the patent medicine men would know just what they would have to pay and what they would get for it. Why don't the testimonial ministers' get together and form a union to regulate this matter, and quit this go-as-you-please business. We charge nothing for the hint, and expect to see some such scheme perfected. The only drawback we see is that the clergyman's indorsements would depreciate in value, and he would have to write a lot more of them to "quit even."

SEEING AT A DISTANCE.

We can see thousands of miles through a telescope, but only under special conditions. So we can hear sounds a long distance away by means of an ear-trumpet, but the telephone is decidedly more comfortable and practical. To devise an instrument that shall be to the telescope what the telephone is to the ear-trumpet, that is, an instrument that shall electrically reproduce a scene or portrait at a distance, as if it were thrown directly on a screen by a lens, has been for many years the dream of a large number of inventors. Now, if we may believe the technical press, the problem has been solved by an Austrian Pole, Herr Szczepanik, or at any rate he has gone farther toward its solution than any of his predecessors. Literary Digest quotes from an article on the subject in *Electricity*, which first gives a brief summary of previous efforts, as follows:

"Several methods were from time to time suggested in which selenium invariably played an important part, owing to the peculiar quality which this substance possesses of varying its electrical resistance according to the intensity of light thrown upon it. In one rather ingenious but crude method suggested, the transmitting and receiving apparatus consisted of two selenium plates in circuit, divided up into minute squares, each of the latter being connected by a separate wire to the corresponding square upon the second plate. It was intended by such an arrangement to reproduce on the receiving plate by electricity, and through the medium of the connecting wires, any image which might be reflected or thrown on the transmitter. Although theoretically such an apparatus should accomplish what was expected of it, provided the squares were minute enough, as will readily be seen, it necessitated the use of an immense number of separate conductors, the difficulty and cost of sorting and distributing them being considered insurmountable."

Herr Szczepanik calls his instrument a "Fernscher," or "teletroscope," and its principle is as follows:

"(He) makes use of four mirrors coated with an opaque substance, two located at the transmitting end of the line and two at the receiving end. On the coating of two of these mirrors numerous parallel lines are drawn by means of a knife or needle, all those on one of the mirrors being at right angles to those on the other, thus exposing a large number of narrow linear strips of reflecting surfaces. This is to allow of only a single line of the object under observation being exposed to the reflective influence of the mirror. The first mirror in which the object is reflected is pivoted and constantly made to oscillate by means of an electro-magnet. Thus the lines of the scene or picture which is being transmitted are continually changing. Each of these single-line reflections is broken up into a series of points by means of the second oscillating mirror, which is located at an angle to the first. Thus, owing to the fact that two lines intersect each other in a point, only a single point of the reflecting line of the first mirror will appear in the second, and therefore the ray corresponding to that point alone will be reflected from the second mirror."

"This ray of light, which corresponds to a given point of the image which is being transmitted, is made to generate a more or less intense current through the medium of a selenium cell. As previously stated, the peculiar property of selenium is that its ohmic (electric) resistance varies with the intensity of the light to which it is exposed, the resistance being usually about twice as great in the dark as in the daylight. Thus, when a cell of the above nature is connected by means of suitable conductors to the receiver, the light rays are converted into electrical impulses of greater or less intensity, which are again reconverted into light rays at the receiving end by means of an electromagnet. This is accomplished by the magnet moving a prism located in front of a strong white light. The latter naturally being broken up into the seven colors of the spectrum. As the prism is made to move through the medium of the electromagnet, it will revolve just far enough to bring the required color into view. The color would now be reflected in one of the two mirrors, which are made to oscillate synchronously with those on the transmitter. In this way each point of the picture

in its natural color is reproduced by the two receiving mirrors and reflected upon a screen. As the separate points follow one another with great rapidity, the observer, so it is claimed, will take in the impression of the entire picture."

Moving scenes, it is said, are transmitted as readily as stationary ones, and the effect may be made to last as long as desired. In the absence of diagrams and details of the mechanism, there will naturally be a good deal of skepticism among scientific men regarding the working of such a complicated device as this, although its theory seems quite correct. Indeed, we are told that it is not yet in satisfactory shape. Says the writer:

It is claimed by those who have had an opportunity of examining Herr Szczepanik's apparatus, and watched the transmission of an image, that the colors in the reproduced picture are not always clear, and the objects reproduced do not remain steady, but are constantly vibrating as in the case of cinematographic images. This defect will, however, undoubtedly be remedied at some future day by the inventor, who is constantly seeking to improve and simplify his apparatus."

The *Electrical Review* says of the new invention:

"Such an instrument, of course, opens up a wide field of possibilities. Scenes of foreign travel, battle fields during action, and the eclipse of the sun are only a few of the things we might have seen recently, while sitting comfortably at home, had Herr Szczepanik had his machine well established a little earlier. As it is, the question arises, has not this Galician genius done away with the necessity of visitors actually going to Paris in 1900?"

THE FRENCH PHARMACY LAW MODIFIED.

Paris, April 19, 1898.

The new pharmacy law voted on March 28 by the Chamber of Deputies and confirmed on April 5 by the vote of the Senate, simply consists of three or four paragraphs extracted from the more elaborate proposition which the late Parliament did not find time to discuss.

The first "article" decrees that henceforth the "second-class" diploma shall be abolished, and that all who desire to practice pharmacy in France will be required to qualify for what is now known as the "first-class" diploma. The remaining paragraphs are framed to keep out foreign students, more especially from those countries which do not offer reciprocal advantages to Frenchmen. The creation of a special diploma, which will simply certify that the student has satisfied the examiners, without giving him any legal right to open shop in France, is provided for, the diploma which accords the privilege of practicing in France being reserved for citizens of those countries where similar rights are allowed to Frenchmen. A "temporary arrangement" allows students to inscribe themselves for the second-class certificate during the next two years, and allows "second-class" pharmacists to practice anywhere in French territory. Up to the present they have only been allowed to open shop in the department in which they took their diploma.

The abolition of the "second-class" diploma will be hailed with satisfaction by French pharmacists in general. This class was provided for by the "law of Germinal" to meet the wants of small towns and outlying districts. But, as a matter of fact, nearly all the second-class men gravitate toward the large cities. The minor qualification having thus been proven useless, an agitation had long ago been set on foot to procure its abolition.

\$1,000 for Gossiping.

Druggists Knoefel & Knoefel, of Louisville, Ky., sued Dr. J. E. Helms, of that city, for \$10,000 damages for saying mean and spiteful and untrue things about them. The jury has ruled that the doctor must pay \$1,000, a tenth of the sum asked, for his incautious and unrestrained exercise of free speech. It is not always safe to assert that druggists are incompetent and unreliable, and we give more than usual prominence to this little item in order to emphasize this fact. The Louisville doctor will have to do a lot of dispensing to get back his thousand.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblenz, A.M., Ph. M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Wilbur G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Ph.M., B., Ph.G.	Edsel A. Raddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Ph.D.	Henry H. Rusby, M. D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Ph.D. Kraemer, Ph.G.,	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and practicing pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 27, 1898; the second term began February 17, 1898, and will end June 30, 1898. The junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum, and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 67.

Inorganic Chemistry.

Rare Elements Related to the Boron, Carbon and Nitrogen Families The Chromium Family.

In addition to the elements previously considered under the boron, carbon and nitrogen families, we are acquainted with a number of elements, mostly of very rare occurrence, more or less nearly related to these families.

On account of their rarity their properties have not been fully determined, and even the elementary character of some of the bodies is not yet beyond question.

THE SCANDIUM GROUP.

	Symbol	Valence	Atomic Weight
Scandium.....	Sc.	3	44.
Yttrium.....	Y.	3	89.1
Lanthanum.....	La.	3	138.2
Ytterbium.....	Yb.	3	173.

These four elements constitute a sub-division of the group of elements to which the boron family belongs.

They are all of extremely rare occurrence, and are found mainly in the minerals Gadolinite and Euxenite. The first member, Scandium, is of interest because of the fact that it corresponds in properties to the hypothetical element "ekaboron," suggested by Mendeleeff in order to fill a gap in the Periodic System.

The compounds of the group have been but little studied. In general, they are more basic in character than the boron elements. They are trivalent, and form sesquioxides, as Sc_2O_3 , etc. Unlike aluminium and its sister elements, their sulfates do not unite with alkaline sulfates to form "alums."

Their occurrence in nature, dates of discovery, etc., are sufficiently exhibited by the following table.

Sc—Found in the mineral gadolinite, etc.; discovered by Nilson in 1819; named from Scandinavia.
Yt—Found in the mineral gadolinite, ytterbite, etc.; discovered by Wöhler in 1828; named from Ytterby, a town in Sweden.
La—Found in the mineral cerite, orthite, etc.; discovered by Mosander in 1839; named from "lanthano," to conceal.
Yb—Found in the mineral gadolinite, ytterbite, etc.; discovered by Marignac in 1878; named from Ytterby.

Other elements sometimes enumerated as members of this group are Neodymium, (Atomic Weight 140.5); Praseodymium, (Atomic weight 143); Samarium, (Atomic Weight 150); Gadolinium, (Atomic Weight 156); Terbium, (Atomic Weight 160); Erbium, (Atomic Weight 168.3); and Thulium, (Atomic Weight 170), etc.

The elemental character of some of these substances

and their place in the periodic system have not been clearly established.

THE TITANIUM GROUP.

	Symbol	Valence	Atomic Weight
Titanium.....	Ti.	3 and 4.	48.
Zirconium.....	Zr.	4.	90.6
Cerium.....	Ce.	3 and 4.	140.2
Thorium.....	Th.	4.	232.6

The above elements constitute a sub-division of the fourth group of the periodic system, and are closely related to the carbon family, the other subdivision of that group. Some of the more important facts concerning these elements are contained in the following table:

Ti—Found in Rutile and brookite; discovered by Gregor in 1791; named from the Latin "Titanes," sons of earth.
Zr—Found in Zircon, ZrSiO ₄ ; discovered by Berzelius in 1824; named from Persian "Zargun," gold-colored.
Ce—Found in cerite and gadolinite; discovered by Berzelius in 1803; named from Greek "Ceres," a planet.
Th—Found in thorite, orangeite; discovered by Berzelius in 1828; named from Icelandic "Thor," god of thunder.

The relations of these elements to the carbon family is shown by their forming dioxides, corresponding in solubility and other properties to silicon dioxide. They are generally capable of acting either as weak acids with strong bases, or as weak bases with strong acids. Their compounds with the alkalies usually resemble the corresponding alkaline silicates.

Certain of the compounds of cerium have had some use in medicine. The oxalate, $\text{Ce}_2(\text{C}_2\text{O}_4)_3$, is recognized by the U. S. P. It has been recommended for use in dyspepsia, and to control the vomiting of pregnancy.

THE VANADIUM GROUP.

	Symbol	Valence	Atomic Weight
Vanadium.....	V.	1, 3 and 5.	51.4
Columbium or Niobium.....	Cb or Nb.	1, 3 and 5.	94.
Tantalum.....	Ta.	1, 3 and 5.	182.6

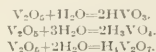
These elements belong to the fifth group of the Periodic System, the other subdivision of which includes the elements nitrogen, phosphorus, arsenic, antimony and bismuth.

V—Vanadates of lead, bismuth and zinc; discovered by Sestrom in 1830; named from "Vanadis," Scandinavian goddess.

Cb—The mineral columbite; discovered by Hatchett, in 1801; named from Columbia.

Ta—The mineral tantalite; discovered by Ekeberg in 1802; named from "Tantalus," Greek mythological character.

The typical member of the group is vanadium, which is the one also about which most is known. It forms five oxides, corresponding in formulae to the oxygen compounds of nitrogen, V_2O , V_2O_2 , V_2O_3 , V_2O_4 , and V_2O_5 . According to the quantity of water with which it combines, the pentoxide forms a metavanadic, ortho-vanadic, and pyrovanadic acid, corresponding to meta, ortho and pyrophosphoric acids.



THE CHROMIUM FAMILY.

CHROMIUM. MOLYBDENUM. TUNGSTEN. URANIUM.

These elements constitute the primary sub-division of the sixth group of the Periodic System, the secondary sub-division of which includes oxygen, sulfur, selenium, and tellurium, and has already received consideration. Their lower oxides, i. e., those in which the metals possess their lower valivalence, are basic in character, while their higher oxides act as acid radicals of considerable power. The first member of the family exists in comparative abundance, while the remaining three belong to the rarer metals.

CHROMIUM.

Symbol, Cr. Valence, 2, 3 and 6. Atomic Weight, 52. Specific Gravity, 5.9 to 7.3.

Historical.—The mineral crocoisite, which is a natural lead chromate, was first described by Lehman in 1762. For some time the substance was regarded by chemists to be a compound of lead, iron, alumina and oxygen, but in 1797 it was carefully examined by Vauquelin, who discovered in its presence of a new element which he named chromium, from the Greek "kroma," color, because of the bright colors of its compounds.

Natural Occurrence.—Chromium occurs in moderate abundance in some localities, but is not widely distributed. Its principal ores are the crocoisite, or lead chromate, $PbCrO_4$, above alluded to, and chromite or chrome-ironstone. It also occurs in small amount as the coloring matter of various minerals.

Preparation.—The element can be prepared in the free state by the reduction of its oxide by heating in contact with carbon, by heating its chloride with metallic sodium, or zinc, or by electrolysis.

Description and Physical Properties.—Chromium is a light green, crystalline powder, or scales, the particles having a metallic luster. Its specific gravity varies according to the mode of preparation from 6.8 to 7.3. It is nearly or quite infusible, and almost as hard as corundum.

Chemical Properties. It oxidizes with difficulty, but when heated in the air burns with a brilliant light. By fusion with such oxidizing agents as potassium nitrate or chlorate it is converted to the trioxide which combines with the potassium present to form the chromate.

It is attacked by chlorine, and readily dissolves in hydrochloric acid. Cold, dilute sulfuric acid affects it but slightly, but on warming dissolves it with evolution of hydrogen. It is not dissolved by nitric acid either hot or cold, weak or concentrated.

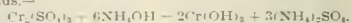
Uses. The element finds but little application in the free state. A small amount 0.5 to 0.75 per cent. added to steel increases the hardness of the latter, but renders it more difficult to work.

COMPOUNDS.

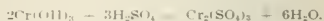
Oxygen Compounds. Chromium forms two important oxides chromic oxide, or sesquioxide, Cr_2O_3 , and trioxide CrO_3 . A chromous hydroxide, $Cr(OH)_2$, is known, but the corresponding acid, CrO_2H , has never been prepared. A chromous-chrome oxide or tri-chromic tetraoxide, Cr_4O_6 , is also known.

Chromous hydroxide is formed when chromous salts are precipitated by means of alkaline hydroxids. Both the hydroxids and the chromous salts are unstable, changing to chromic compounds when exposed to the air or when treated with oxidizing agents.

The sesquioxide corresponds to chromic hydroxide. $Cr(OH)_3$, precipitated from chromic salts by alkaline hydroxids,—



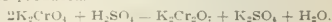
Chromic hydroxide redissolves in the fixed alkalies, forming chromites, which are decomposed and the hydroxide reprecipitated on heating. It is but slightly soluble in excess of ammonium hydroxide. With acids and acid-forming substances the sesquioxide and the hydroxide act as a base, dissolving to form chromic salts.



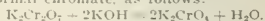
Chromium trioxide can be prepared by decomposing a chromate or dichromate with sulfuric acid and crystallizing. It crystallizes in needles of a beautiful crimson-red, which are freely soluble in water, and decomposed by heat into oxygen and the green chromic oxide. It is a powerful oxidizing agent, acting with such rapidity as to set fire to many organic substances, as ether, cork, etc., with which it is brought in contact.

Oxygen Acids of Chromium.—Theoretically, the trioxide is the anhydride of chromic acid, H_2CrO_4 , which, however, is not known in the free state, but only in the form of its salts, the chromates.

One of the most important of these is potassium chromate, K_2CrO_4 , which crystallizes isomorphously with potassium sulfate. It occurs in bright yellow crystals, and is freely soluble in water. By treatment with a dilute acid part of the alkaline base is removed, and the dichromate is produced.



Potassium dichromate occurs in brilliant orange-red plates or prisms. It is a strong oxidizing agent, and is much used in chemistry and the arts for this purpose. By the addition of alkalies the dichromate is reconverted into the normal chromate, as follows:



The chromates and dichromates precipitate many of the metals from solutions of their salts. The resulting chromates are possessed of bright colors, and some of them are used as pigments.

When potassium chromate is treated with hydrogen dioxide, the chromium undergoes a further oxidation and a deep blue solution is formed which is believed to contain a salt of the theoretical perchromic acid, $HCrO_5$. Neither this acid nor its corresponding anhydride, Cr_2O_5 , is known.

Halogen Compounds.—The most important halogen compounds of chromium are chromous and chromic chloride.

Chromous chloride, $CrCl_2$, may be obtained either by heating powdered chromium in dry hydrochloric acid gas, or by reducing chromic chloride in a current of hydrogen. In the dry state it is a white, crystalline substance, but dissolves in water to form a blue solution. This solution is remarkable for its reducing or decolorizing power, owing to its tendency to change to the chromic salt.

Chromic chloride, $CrCl_3$ or Cr_2Cl_6 , can be prepared in solution by dissolving chromic hydroxide in hydrochloric acid, or by heating chromic oxide, mixed with carbon, in a current of chlorine. As obtained by the latter method it forms beautiful shining scales which are a "peach blossom color," and is practically insoluble in pure water, though soluble in water containing small quantities of certain reducing agents.

Chromous and chromic bromide have properties similar to those of the chlorides. The existence of a chromic iodide is disputed. A chromic fluoride, CrF_3 , has been prepared in the form of a green crystalline mass by dissolving chromic oxide in hydrofluoric acid and crystallizing.

Salts of the Oxygen Acids. The most important salt of chromium with an oxygen acid is chromic sulfate, obtained by dissolving chromic hydroxide in dilute sulfuric acid. It crystallizes in violet colorless crystals, containing eighteen molecules of water, $Cr_2(SO_4)_3 \cdot 18H_2O$. The solution is remarkable for its color changes, being green when first prepared, becoming violet on standing, and changed to green again by boiling.

The sulfate when united in solution with potassium sulfate forms "chrome alum," or potassium-chromium sulfate, $K_2Cr_2(SO_4)_3 \cdot 24H_2O$. The potassium sulfate may be replaced by the sodium or ammonium salt, as in common alum.

Uses.—The principal uses of the chromium compounds are in dyeing operations, in the manufacture of the pigments which have been previously mentioned, and as reagents in the chemical laboratory.

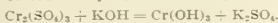
Characteristic Reactions.—Chromium is easily and certainly identified by numerous reactions.

Any compound of chromium will color the borax bead emerald green. Chromic salts, as the sulfate, yield a grayish precipitate with alkali hydroxids, soluble in excess of fixed alkalis to a green solution, and reprecipitated on boiling. Chromates and dichromates precipitate yellow lead chromate from solutions of lead salts, yellow barium chromate from solutions of barium salts, and red silver chromate from silver salts.

PRACTICAL STUDIES.

1.—Make a borax bead in the usual manner, saturate with any compound containing chromium, and heat with the blow-pipe. Note the color of the bead both hot and cold.

2.—To solution of chromium sulfate add solution of potassium or sodium hydroxid. Balance the equation,—



3.—Pour off the supernatant liquid from the preceding and add more of the alkali.

4.—Heat the solution obtained in the last experiment.

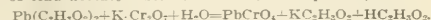
5.—Repeat experiments 3 and 4, using ammonium hydroxid instead of the fixed alkali. How do the results differ?

6.—Add solution of potassium dichromate to solution of silver nitrate. What takes place? Balance the equation,—



7.—Repeat the last experiment, using barium chlorid instead of silver nitrate. What is the precipitate produced?

8.—Repeat the experiment again, but using a solution of lead acetate instead. Balance the equation,—



LECTURE No. 68.

Pharmaceutical Processes.

Under this title it is designed to give some account of the general and special processes employed in operative pharmacy, together with a description of some of the more important varieties of pharmaceutical apparatus.

The discussion must, of necessity, be somewhat elementary in character and limited in its scope, and should, therefore, be supplemented by readings in the various text-books devoted to the subject, as the manuals of Caspari, Coblentz, Remington and others.

DEFINITION AND CLASSIFICATION OF PROCESSES.

But few substances occur in nature in a form adapted for immediate use as medicine. Pharmaceutical processes, therefore, are the processes which must be applied to the crude natural and commercial substances to fit them for medicinal or pharmaceutical use. Some of these are peculiar to pharmaceutical practice alone, while many of them are common to other arts and sciences as well. The particular process to be made use of in a given case depends both upon the nature of the material to which it is to be applied and upon the final condition into which it is to be brought, and it will, therefore, be found convenient to consider these processes according to a classification somewhat similar to that which physicists have adopted for the properties of matter.

All known forms of matter possess extension or space-occupying properties, weight or mass, susceptibility to the effects of heat, etc. These are known as Essential or General properties, since they could not be removed or destroyed without also destroying the essential characters of matter as it is known to us. Certain other properties, as solidity, fluidity, hardness, form, color, size, etc., may or may not be present in a body without affecting its existence as a portion of matter. These may, therefore, be known as Incidental or Special properties, since the destruction of any one of them does not necessarily involve the destruction of the portion of matter to which it belonged.

Adopting a similar classification for pharmaceutical processes, we shall have (1) General Processes, or those processes which affect or are concerned with the essential or general properties of matter, and (2) Special Processes, or those which affect or are concerned with the incidental or special properties of matter.

While the present state of pharmaceutical science will not permit us to adhere rigidly to the above classification in all respects, the general principle will, nevertheless, be kept in mind, and the processes of pharmacy will be considered substantially according to the following outline:

GENERAL PHARMACEUTICAL PROCESSES.

1. Weighing and Measuring, or operations involving the masses and volume of bodies and their relations.
2. Generation and Application of Heat.

SPECIAL PHARMACEUTICAL PROCESSES.

- (a) Involving a Change in Form or State of Aggregation.
 1. Processes of Committion.
 2. Processes of Liquefaction.
 3. Processes of Solidification.
- (b) Involving a Change of Relation.
 1. Processes of Separation.
 2. Processes of Combination.

WEIGHING AND MEASURING.

Measurements may be either of the quantity of matter which a body contains, or of the force or energy which it possesses. Quantity of matter may be estimated either by measurement or extension or by weight. The Extension of matter may be in one direction, from which is derived Linear Measure; in two directions, from which is derived Square Measure; or, in three directions, from which is derived Cubic or Volume Measure.

The quantity of matter which a body contains, or its Mass, may also be estimated by measuring its gravitational force, i. e., by determining the force with which it is attracted to the earth. This is usually accomplished by comparing its attraction with the attraction of certain standard masses denominated weights. When the body whose mass is to be determined and the standard mass are supported at the opposite ends of a beam which is balanced at its center and free to move without friction, if the beam comes to rest in a horizontal position, the body is said to have the same weight as the standard mass. What is meant by this is that the body and the standard mass possess the same gravitational force, i. e., that they are attracted toward the center of the earth with the same intensity. Sometimes the gravitational force of a body is determined by noting the extent to which it compresses or distends a spring which has previously been compared by the maker with standard weights.

Measurements, whether of lines, surfaces, volumes, masses or quantities of force or energy, are always comparisons of the thing measured with known units selected as standards.

Ancient Standards.—Anciently, there was but little, if any, connection between the different units used for the measurement of lines, surfaces, volumes and weights. Such units as did exist were usually derived from some familiar natural object, and generally liable to great variation in value. Examples are the "cubit," which was the distance from the elbow to the extremity of the middle finger; the span, the distance between the ends of the

thumb and the least finger, when the hand is extended; the grain, the weight of a grain of wheat; the karat or carat, the weight of a small bean, etc. Many hundreds of such standards are enumerated in modern dictionaries. With the increase of civilization and the growth of commercial interests more exact standards became necessary. Especially within the last century much interest has been taken in the selection of a system of weights and measurements, which shall satisfy modern requirements, and much progress has been made in the selection of appropriate and comparable units.

Requirements of a Perfect System of Weights and Measures. Measures.—A perfect system of weights and measures would possess the following features:

(1) It would be based on some natural standard not liable to variation, and easily referred to for the purpose of verification.

(2) The several primary units for the measurement of lines, surfaces, volumes and weights would bear a simple relation to each other, so as to admit of their ready comparison.

(3) The order of the units would increase and decrease in such a ratio as to permit their easy multiplication and subdivision.

(4) The system would be universal; i. e., the units would have the same values, be known by the same names in all countries, and used in all transactions.

No system at present in use exactly satisfies the several requirements above mentioned, but the one which offers the greatest number of advantages is the Metric System, which originated in France near the close of the last century.

THE METRIC SYSTEM.

Theory of the Metric System.—As a basis is taken the forty-millionth part of the earth's meridional circumference, or the ten-millionth part of the distance from the equator to the pole, measured on the meridian which passes through Paris. The measure thus found was selected as the primary unit of length and called the Meter (from the Greek "Metron," meaning a measure), and gives to the system its name. The remaining units of length are derived from the Meter by dividing or multiplying in a decimal ratio. The subdivisions of the meter are distinguished by the Latin prefixes deci—tenth; centi, hundredth, and milli, thousandth. The multiples of the meter have the prefixes: Dekka, ten; Hekto, hundred, and Kilo, thousand. From the Meter the primary units of surface or square measure, cubic or volume measure and of weight are derived. Their multiples and subdivisions are distinguished by the same prefixes as are used for the units of linear measure.

The primary unit of square measure is the Are, which is the square of ten meters, or a square Dekkameter.

The primary unit of volume measure is the cube of the tenth of a Meter, and is called the Liter, or Cubic Decimeter.

The primary unit of weight is the weight of that volume of distilled water, which measures the one-thousandth of a liter, and is called the Gram.

The tables of measures of length, weight and volume should be thoroughly committed to memory by the student, together with their equivalents in the common systems.

Table of Linear Measure.

The Meter is the primary unit, approximately 39.37 inches.

The Millimeter is the thousandth of a meter, approximately 1-25th inch.

The Centimeter is the hundredth of a meter approximately two-fifths inch.

The Decimeter is the tenth of a meter, approximately 4 inches.

The Dekameter is 10 meters.

The Hektometer is 100 meters.

The Kilometer is 1,000 meters.

Table of Square or Surface Measure.

The Are is the primary unit. It is a square Dekkameter.

The Centiare is the one-hundredth of an are.

The Hectare is one hundred ares.

Table of Volume Measure

The Liter is the primary unit. It is the cube of a decimeter, approximately 33.81 fl. oz.

The milliliter is the thousandth of a liter, approximately 16-23 minims.

The centiliter is the hundredth of a liter.

The deciliter is the tenth of a liter.

The Dekaliter is ten liters.

The Hektoliter is one hundred liters.

The Kiloliter is one thousand liters.

NOTE.—The milliliter is generally known as the Cubic Centimeter. The name Fluiogram has also been proposed.

Table of Weights.

The Gram is the primary unit. It is the weight of one cubic centimeter of water.

The milligram is the thousandth of a gram. Approximately 1-64 grain Troy, or .015 gr.

The centigram is the hundredth of a gram. Approximately .154 grain Troy.

The decigram is the tenth of a gram. Approximately 1.54 grain Troy.

The Dekagram is ten grams.

The Hektoqram is one hundred grams.

The Kilogram is one thousand grams.

The Metric Ton is one thousand Kilograms.

As in all other systems of weights and measures, certain of the metric units are used more frequently than others. Those which are most commonly employed in pharmacy, with their abbreviations, are as follows: The millimeter (mM), the centimeter (cM), the milligram (mGm), the gram (Gm), the centigram (cGm), the kilogram (kilo or KGm), the cubic centimeter (Cc) or fluiogram (fGm), and the liter (L). The English mode of spelling and pronouncing is generally followed by English-speaking pharmacists.

In the United States Pharmacopœia the gram is spelled "gramme" to lessen the danger of its being confused with the word grain. The official abbreviations for gramme and cubic centimeter are Gm. and Cc. In writing the metric system the common Arabic numerals are used, and are always placed before the units or abbreviations, thus 10 Cc., 1.5 Gm., etc.

The Metric System was the preferred system in the Pharmacopœia of 1880, and was exclusively adopted and made the official system of weights and measures by the revision of 1890. It is practically the only system employed in scientific work, and is used exclusively by all the great nations of the earth, except the United States, Great Britain, Russia and Turkey; these four countries being behind even Egypt in this respect.

Advantages of the Metric System.—The advantages of the new system when compared with the old are so great that its universal adoption by all civilized nations for use in commercial transactions, as well as in scientific investigations, seems only a question of time. The popular belief that it is more difficult to understand than the systems now in use is without foundation. It is evidently as easy to weigh a kilogram of merchandise or measure a liter of liquid as to weigh a pound or measure a quart of the same material, while in the matter of computations the advantages are altogether on the side of the decimal system.

The difficulty experienced by those who use the metric system for the first time usually arises from the attempt to compare the new units with the old, but even this disappears with a short practice, and were metric weights and measures used exclusively, would not exist at all. When merchants and druggists can be persuaded to abandon their old weights and measures and provide themselves with new ones, these difficulties will quickly be seen to be largely imaginary.

It is probable, also, that the opposition to the adoption of the new system arises quite as much from the necessity of learning a new set of names which have a strange sound to the unaccustomed ear, as from the necessity of acquiring a new set of standards.

AVOIRDUPOIS, APOTHECARIES' AND IMPERIAL SYSTEMS.

The systems of weight in common use by the English-speaking peoples of the world are the Avoirdupois and Apothecaries' Systems. The primary unit of both is the old Troy Grain, which is approximately equal to 65 milligrams of the new system. There is no other unit common

to the two systems. Their ounces contain a different number of grains and their pounds a different number of ounces.

Avoirdupois or Imperial Weight.—This is the weight used almost exclusively in the commercial transactions of the United States and Great Britain, and is also used by pharmacists in buying or selling drugs, but not in compounding them. Avoirdupois Weight is identical with the Imperial Weight of Great Britain.

Table of Avoirdupois Weight.

The Grain is the smallest unit. Approximately 65 mGms.

The Dram is 1-16 ounce, or 27.34 grains.

The Ounce (oz.) is 437.5 grains. Approximately 28.35 Gm.

The Pound (lb.) is 16 ounces, or 7,000 grains. Approximately 453.59 Gm.

The Ton is 2,000 avoirdupois pounds.

In writing this system, Arabic numerals are used, and are placed *before* the signs, as in the metric system. Except when used in the compounding of prescriptions, medicines are bought and sold by Avoirdupois weight.

Apothecaries' Weights.—This is the system almost universally used in the writing and compounding of prescriptions in Great Britain and the United States.

Table of Apothecaries Weight.

The Grain is the smallest unit. Approximately 65 mGms.

The scruple (℥) is twenty grains. Approximately 65 1.29 Gm.

The dram (ʒ) is three scruples or 60 grains. Approximately 3.888 Gm.

The ounce (ʒ) is 8 drams or 480 grains. Approximately 31.000 Gm.

The Pound (lb.) is 12 ounces or 5,760 grains. Approximately 373.250 Gm.

Formerly the apothecaries' ounce was divided into 24 "pennyweights" of 20 grains each instead of into scruples and drams, and was then known as "Troy Weight."

In writing this system, the numbers are expressed in Roman numerals and are placed *after* the signs, as ʒ vi, gr. x, etc.

In comparing the systems it will be noticed; that the troy or apothecaries' ounce contains 48 grains more than the avoirdupois ounce; that the apothecaries' pound contains 12 ounces, or 5,760 grains, and the avoirdupois pound 16 ounces, or 7,000 grains; and the apothecaries' ounce is divided into scruples and drams, while the avoirdupois ounce is not usually so divided, the use of the avoirdupois dram or the sixteenth of an ounce being nearly obsolete in this country. The fact should be noted also that different signs are used to designate ounces and pounds in the two systems.

Apothecaries' Fluid or United States Wine Measure.—The fluid measure of the apothecary is the same as the Liquid or Wine Measure in common use in the United States. The gallon has the bulk of 231 cubic inches, and is the old wine gallon which was in use in Great Britain prior to the reformation of English measures in 1825-6.

Table of Wine Measure.

The minim (m) is the smallest unit. Approximately 0.06 Cc.

The fluidrachm (fl.ʒ) is 60 minims. Approximately 3.7 Cc.

The fluidounce (fl.ʒ) is 8 fluidrachms or 480 minims. Approximately 29.57 Cc.

The pint (O) is 16 fluidounces. Approximately 473.11 Cc.

The gallon (Cong.) is 8 pints. Approximately 3.785 L.

The fluid ounce of distilled water weighs 455.7 grains, and is therefore 18.2 grains heavier than the Imperial fluidounce.

In writing Apothecaries' fluid measure, quantities are indicated by Roman numerals written *after* the appropriate signs, as ʒ vi, etc., as in writing apothecaries' weights. Fluidounces and fluidrachms are denoted by the letter *f* placed before the signs for ounce and dram.

The greatest defect of the system is the absence of any correspondence between its units and those of the Avoirdupois and Apothecaries' systems of weight.

British or Imperial System of Fluid Measure.—The system of fluid measure at present in use in Great Britain and the colonies, and official in the British Pharmacopœia, is the Imperial Fluid Measure, adopted at the reform of English weights and measures in 1825-6. This reform consisted in changing the old wine measure, identical with the fluid measure at present in use in the United States, so as to bring it into a more simple relation to the avoirdupois system of weight. Its primary unit is the fluidounce, which is that volume of distilled water which weighs 437.5 grains, or one avoirdupois ounce.

Table of Imperial Measure.

The Minim (min) is the 480th of the fluidounce.

The Fluidrachm (fl. dr.) is 60 minims or 1/8 fluidounce.

The Fluidounce (fl. oz.) is the volume of an avoirdupois ounce of distilled water.

The Pint (O) is 20 fluidounces, equal to 1 1/4 pounds of distilled water.

The Gallon (C) is 8 pints, equal to 10 pounds of distilled water.

In comparing Imperial with U. S. Wine Measure it will be noted; That while the names of the units are the same, their values are different; that the pint consists of twenty avoirdupois ounces of water, and that the signs which stand for minim, fluidrachm and fluidounce have been changed, while the signs for pint and gallon remain the same.

The only advantage of this system over the old is the relation of the ounce and gallon to the ounce and pound avoirdupois; the fluidounce being the volume of an avoirdupois ounce of distilled water, and the gallon the volume of 10 avoirdupois pounds of distilled water.

WEIGHING MACHINES.

The weights of objects are determined by the use of machines called Balances. Some varieties of weighing machines are frequently known as Scales, probably derived from "scala," the Anglo-Saxon for dish or pan, in allusion to the pan-like receptacles employed to hold the weights and the substance which is being weighed. It is common among manufacturers to apply the term scales to the coarser and less delicate instruments which are used for common and commercial purposes, and to restrict the name of balance to instruments of the better class, such as are suitable for analytical purposes. It is doubtful whether this distinction is either necessary or useful, and whether the term balance should not be applied to all weighing machines, without reference to their construction.

KINDS OF BALANCES.

Probably the most general division that can be made of Weighing Machines is into Beam or Lever Balances, or those which require the use of weights; and Spring Balances, or those which do not require the use of weights.

Spring Balances.—In this variety of weighing machine the substance to be weighed is balanced against the elasticity of a coiled or spiral spring, the tension of which has been adjusted at the manufactory by comparison with known weights, so that a given amount of compression or extension corresponds to a definite amount of gravitational force. In such instruments the weight is indicated by means of a pointer, which travels over a printed or engraved scale. The absence of weights makes their use very convenient, it being merely necessary to place an article upon the pan or platform, when its weight is at once automatically indicated by the pointer. Though not sufficiently delicate for compounding purposes, they are sufficiently accurate for the weighing of coarse goods and for many ordinary commercial requirements. The absence of weights and their quick action make them favorites with butchers and market men.

In some instruments of this pattern the principles of both the spring and lever balances are combined, one end of a lever being made to move a pointer over a circular dial, while the other acts upon a spring which is compressed or extended by the load.

BEAM OR LEVER BALANCES.

The fundamental idea of the Beam or Lever Balance is that of an inflexible bar supported horizontally upon a

fulcrum and free to oscillate without friction. The ordinary method of weighing is to place the substance in the pan on one end of the beam and to add weights to the pan at the other end of the beam until equilibrium is restored. This arrangement of the beam, so that the fulcrum or point of support is between the weights and the article to be weighed, is what is termed in physics, a lever of the first order.

According to location of the fulcrum with relation to the ends of the beam, machines of this order may be divided into Equal and Unequal Arm Balances.

THE EQUAL ARM BALANCE.

The Equal Arm Balance depends upon the mechanical principle that when the arms of a lever are of equal length, a given load applied at one end will support an equal load at the other. On an equal arm balance the



Fig. 1.—Equal Arm Balance.

weight has theoretically the same mass as the body which it sustains in equilibrium, but if the bodies have different volumes, this is not absolutely true, owing to the buoyant force of the air. For all ordinary purposes, however, this slight variation may be disregarded.

The equal arm balance is adapted to the widest range of usefulness, and has been constructed of such a degree of delicacy as to turn with one ten-millionth of the load in the pans. It is the type of construction universally used in analytical balances and in all balances of precision.

UNEQUAL ARM BALANCE.

In balances of unequal arms, as indicated by the name, the fulcrum is nearer to one end of the beam than to the other. This type of construction is based upon the principle that, when the arms of a lever are

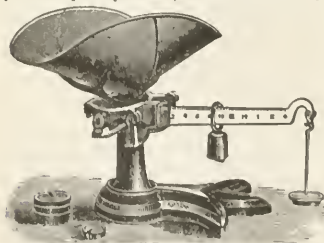


Fig. 2.—Unequal Arm Balance.

length of the arm which supports the substance to be weighed, then a given mass at the end of the longer arm will balance twice its mass at the end of the shorter arm, and so on.

The advantages of the unequal arm balance are the facts that a small weight can be made to balance a

large mass, and that the same weight may be made to balance different loads by varying its position on the longer arm. The longer arm is commonly marked with a scale, and provided with a movable weight. The familiar Grocer's Scales are common examples. These are frequently constructed with two beams, so that the tare of a vessel in which a substance is to be weighed may be taken with the movable weight on one beam, and the true or net weight of the substance with the other.

These conveniences make them peculiarly well adapted to commercial purposes, and they constitute perhaps the greater number of weighing machines in use where great accuracy is not required.

NOTE.—By "tare" is meant the excess of the gross above the net weight, as, for instance, the weight of a vessel in which a substance is weighed. A "tared vessel," then, is one whose weight or "tare" is known.

By a combination of levers in such a way that the short arm of one is made to act upon the long arm of another, there is constructed the Compound Lever Balance, adapted to the determination of great weights, such as wagons and railroad cars. The common Platform Scales used in warehouses are examples of this kind.

KNIFE EDGE AND TORSION BALANCES.

According to the manner in which the beam is supported at the fulcrum, lever balances may also be divided into Knife-Edge and Torsion Balances.

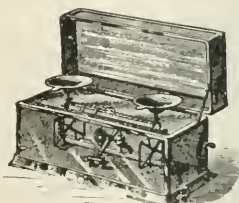


Fig. 3.—Torsion Prescription Balance.

A knife-edge balance is one in which the fulcrum which supports the beam consists of steel or agate knife edges, bearing upon plane or slightly concave pieces of similar material. The only points at which friction can operate are at the points of contact of the knife edges and their bearings, by which means friction is reduced to a minimum.

In the torsion balance, the beam is firmly attached to a flat steel band tightly stretched upon a strong metal frame. When the beam oscillates, the band twists from side to side,

and this twisting or "torsion" gives to the instrument its name. The supports of the pan stirrups are also constructed in a similar manner. Delicacy is secured by means of an adjustable weight placed over the center of the beam in such



Fig. 4.—Torsion Analytical Balance.

a manner that its elevation raises the center of gravity almost to the point of unstable equilibrium. The object of this device is to overcome or neutralize torsional resistance, or the resistance which the band opposes to being twisted.

When properly constructed, torsion balances are fairly delicate, quick acting, durable and available for a variety of purposes.

STOVE POLISH.—Molasses is evaporated in a vacuum pan as nearly as possible to dryness. To the residue as much graphite is added as it will take up, and the mixture made homogeneous by passing between rollers or flat stones. The mass must be kept dry to prevent it from becoming moldy. (Drog. Ztg.)

(Special Correspondence.)

GREAT BRITAIN'S NEW PHARMACOPEIA.

London, April 12.

After much hard work and a tremendous amount of revision the advance copies of the new British Pharmacopœia have been issued, and by the time *Era* readers peruse this it is most probable that their English confreres will have their new guide and companion to work from.

The general appearance of the text of the work is much the same as in the 1885 edition, but when one settles down to read it carefully the alterations are found speedily and continuously, and speaking from the opinion created by a short perusal only, the improvements are good and based upon the work of the numerous scientific investigators of the past thirteen years.

As the different headings are reached it is not difficult for anyone who is acquainted with present day pharmaceutical literature to detect the originators of several of the most important alterations in the text, but these instances are very numerous and the alterations in general principles in all the spheres of the work are perhaps more noticeable.

The adoption of the metric system of weights and measures is the greatest step in advance, and if chemists will only use it there is no doubt it will pave the way to a more universal adoption of the system. In standardized preparations the proportions of active ingredient are given as grammes in 100 cubic centimeters, or the equivalent of grains in 110 minims.

The introduction of metric weights has necessitated the alteration of many strengths and doses, yet there appears to be a greater uniformity on the whole, and although the principles of standardization of vegetable preparations containing alkaloids have not been adopted in many instances, yet in the few which have become official the methods of analysis are fairly simple and of known accuracy. There was some talk of making this edition an Imperial Pharmacopœia, but this has not been found quite feasible yet, although a paragraph has been inserted permitting the stiffening of ointments and the addition of more alcohol to preparations which are prone to fermentation, when such a proceeding is needed, in tropical countries, and further it is known that an appendix will be issued in which the native drugs of the colonies will be considered.

Among the innovations are changes in nomenclature, all hydrates are named hydroxides, and the hydrochloric acid salts of alkaloids are now named hydrochlorides instead the misleading hydrochlorates, phosphate of iron is now termed iron phosphate and in like manner many other salts are slightly changed in name. *Asafoetida* is spelt with one "s" and *Araroba* with the same number of "r's" as before.

The tests for chemicals and drugs have undergone drastic revision, and it is quite a relief to be able to read that a salt should give no reaction for the presence of either "chloride, sulphate, iron or lead," instead of having to read the full tests for each in every instance. Tests have been dealt with in general at the end of the book, but the specific tests and new tests for individual substances are in many cases very stringent.

The standards for beeswax and cream of tartar are not as high as might be expected, and that of jalap errs on the right side also.

Amongst the standardized alkaloidal galenicals *Ext. Ipecac. Liq., Ext. Nucis Vom. Liq. and Ext. Belladonnae Liq.* are quite fresh, and *Tinct. Cinchonzæ, Tinct. Cinchonzæ Co., and Tinct. Jalapæ* are standardized for the first time, and *Tinct. Opil* is standardized more specifically than heretofore. The liquid extract of *Ipecacuanha* is made to contain from 2 to 2.25 per cent. of total alkaloid and is employed for making the "Acetum" and "Vinum."

Liquid Extract of *Belladonna* is standardized to 0.75 per cent. of total alkaloid, and from it the *Extractum, Tinctura, Emplastrum* and *Unguentum* are to be made. It is prepared from the root, and puts the pharmacy of belladonna upon a much firmer and satisfactory basis than was afforded by the leaves. Liquid Extract of *Nux Vomica* is standardized on its *Strychnine* content and adjusted to contain 5 per cent. of *Strychnine*, no consid-

eration of the *Brucine* being taken. From the liquid extract a solid one is prepared by evaporation and addition of milk sugar.

Concentrated Infusions have been taken cognizance of under the name of *Liquores Concentrati*, and a number of the vegetable preparations in common use are included in the list.

Among the contents of any pharmacopœia no class finds more general use than tinctures, and here in the new edition the alterations will necessitate the overhauling of every pharmacist's stock, for, on the day the publication of the new edition is gazetted by the General Medical Council it will come into force and old stocks will have to be replaced. Tinctures mean a big item in any pharmacist's stock, because of the alcohol they contain.

This brings me to the question of alcohol, or, as it is now more scientifically named, *Ethyl hydroxide*. Hitherto absolute alcohol, rectified spirit (.858), and proof spirit (.920), were the only standards, and they were fairly well defined, but it is obvious that rectified spirit and proof spirit could not meet all the demands for variation in solvent properties which the numerous drugs required. So now several strengths are given, and alcohol of 90 per cent., 70 per cent., 60 per cent., 45 per cent., and 20 per cent. strength is ordered, according to its suitability for any particular preparation. Absolute alcohol is stated to be of specific gravity .7940 to .7969 at 15.5° C., as compared with water at the same temperature, and consequently contains from 90.95 to 99.4 per cent. of real absolute alcohol. The definition that specific gravities at 15.5° C are to be taken as compared with water at a like temperature is a useful one, and will settle a lot of indecision which has existed.

It is just as well to let pharmacists get thoroughly acquainted with the principles of standardization before giving them more to do, and the few included this time will pave the way for others.

The processes of manufacture are not given with each tincture now, but the general principles are collected under one heading, and this suffices.

Essential oils have been carefully considered, and more definite characters attached to their description, and their optical rotations included amongst the tests. One or two of the figures seem biased, or perhaps variations have not been considered sufficiently. Standards for *asafoetida* and *araroba* are now given, and *scammony* is altered a little.

The additions number about eighty and the deletions about one hundred and eighty, and yet the book has grown no smaller, all the poultices and enemata have been left out and a large proportion of the extracts, infusions and liquors which have dropped out of use.

Animal extracts and products are represented amongst the inclusions by *Glycerole Pepsin, Liq. Pancreaticus* and *Liq. Thyroidal*, but the number of new chemicals is very small and synthetic remedies are almost ignored.

The alteration in the numberless quantities of minor importance will be a tax to students for a time, but from their standpoint the new work should prove a good text book in many ways; it has been compiled under the guidance of Dr. Nestor Tirard, who acted as secretary to the General Medical Council Pharmacopœia Committee, of which the late Sir Richard Quain was president, but the whole work has been edited by Prof. Atfield. A committee of representative pharmacists were appointed by the General Medical Council to advise on several subjects, and eminent experts were engaged in the chief branches of science which were needed, and consequently we may confidently say that Great Britain has the best and most complete pharmacopœia of the day, and its usefulness as a work of reference cannot be questioned.

The list of new additions to the pharmacopœia comprises the following articles and preparations:

Acid quinine hydrochloride	Concentrated solution of senega
Araroba	Concentrated solution of senna
Aromatic syrup	Concentrated solution of serpentary
Aromatic syrup of cascara	
Belladonna suppositories	Dilute of homatropine
Benzol	Dry thyroid
Bismuth salicylate	Effervescent caffeine citrate
Carbon bisulphide	Effervescent lithium citrate
Cocaine	Eucalyptus gum lozenge
Codine phosphate	Extract of strophanthus

Concentrated compound solution of sarsaparilla
 Concentrated solution of calumba
 Concentrated solution of chiretta
 Concentrated solution of cuscutaria
 Concentrated solution of krameria
 Concentrated solution of quassia
 Concentrated solution of rhubarb
 Fresh bitter orange peel
 Glycerin of boric acid
 Glycerin of perle
 Hyoscine hydrobromide
 Hyosyamine sulphate
 India-rubber
 Infusion of broom
 Kaolin
 Liquid extract of belladonna
 Liquid extract of ipecacuanha
 Liquid extract of jaborandi
 Liquid extract of nuxvomica
 Lozenges:
 Guaiacum resin lozenge
 Krameria lozenge
 Krameria and cocaine lozenge
 Phenol lozenge
 Mercuric oleate
 Morphine tartrate
 Naphthol
 Oil of pine
 Oil of rose

Articles and preparations omitted are:
 Aconite leaves,
 Ammonium nitrate,
 Amylic alcohol,
 Bismuth,
 Bismuth citrate,
 Bismuth and ammonium citrate,
 Bitter orange,
 Bromine,
 Canella bark,
 Cinchona bark,
 Cinchonine sulphate,
 Cinchonidine sulphate,
 Copper nitrate,
 Glycerin of gallic acid,
 Guaiacum,
 Honey,
 Iron peroxide,
 Kamala,
 Lactic acid,
 Larch bark,
 Lead nitrate,
 Leaf tobacco,
 Lettuce,
 Manna,
 Mastiche,

Ointments:
 Capsicum ointment
 Cocaine ointment
 Mercuric oleate ointment
 Paraffin ointment
 Rosewater ointment
 Yellow mercuric oxide ointment
 Pancreatic solution
 Salicylic acid suppositories
 Physostigmine sulphate
 Pill of quinine sulphate
 Powdered coal tar
 Quilla bark
 Salol
 Solution of coal tar
 Solution of ethyl nitrite
 Solution of hamamelis
 Solution of hydrogen peroxide
 Solution of india-rubber
 Solution of morphine tartrate
 Spirit of anise
 Strychnine hydrochloride
 Syrup of calcium lactophosphate
 Syrup of codine
 Syrup of glucose
 Syrup of phosphate of iron with quinine and strychnine
 Syrup of Virginian prune
 Terebene
 Thyroid solution
 Tincture of quilla bark
 Tincture of Virginian prune
 Ammoniated tincture of ergot
 Virginian prune bark

Matteo leaves,
 Monelic acid,
 Mercury oleate,
 Mercury persulphate,
 Milk,
 Morphine sulphate,
 Oak bark,
 Oil of rue,
 Oil of savin,
 Oleoresin of cubebs,
 Potassium ferrocyanide,
 Proof spirit,
 Purified bismuth,
 Raisins,
 Refined silver,
 Santonina,
 Simple ointment,
 Sodium nitrate,
 Sodium valerianate,
 Solution of dialysed iron,
 Solution of iodine,
 Vinegar,
 White marble,
 Zinc oleate.

(Written for the Era.)

PHARMACY IN NOVA SCOTIA.

BY HYDRASTIS CANADENSIS.

Pharmacy in Nova Scotia as a regular profession may be said to date from the year 1876. Prior to that date there was no pharmacy act in force, and any person who possessed the capital could develop into a full-blown druggist by simply purchasing the necessary stock and opening a store. There were, however, a good many druggists who had qualified themselves by examination in the United States, Canada and Great Britain, and it was by their efforts that the Nova Scotia Pharmaceutical Society came into existence and received the legal recognition which enabled it to terminate this unsatisfactory state of affairs. All persons who at the passing of the act (April 4th, 1876), were bona fide proprietors of drug stores, and all assistants who had served a seven years' apprenticeship and were over 21 years old, became entitled to register. They were, however, obliged to do so on or before the last day of December, 1877. A board of five examiners was appointed, three of whom were chosen by the society, and two by the provincial government. The legal duration of apprenticeship was fixed at three years, (it has since been increased to four), and provision was made for the enforcing of the act, and the imposition of severe fines for its violation and evasion.

During the twenty-three years which have elapsed since the act received the Royal assent, there has been a marked improvement in the general tone of the business in the province, and in the social and professional status of the gentlemen who earn their living by it. With the exception of Halifax, Truro, Ament and New Glasgow, most of the towns in the province are small. Many of them have a population of under 3,000, and some "towns" have less than 2,000; but they all act as distributing centers to the farming, fishing and mining population, and consequently they can maintain more drug stores than their diminutive size would seem to warrant.

We find by the Royal Gazette that on February 9th there were sixty-six registered and qualified druggists in the province. Of these about one-fifth have taken the degrees of Ph. G., or Ph. B. at some college of pharmacy. Three-fifths have graduated by examination before the Provincial Board, and the remainder are doctors of medicine, who have been admitted on their medical diplomas, and gentlemen who were qualified by servitude at the passing of the act in 1876. The city of Halifax, of course, leads with nineteen registered men, though oddly enough the County of Halifax, and it is a large one, only has one apothecary. The Annapolis Valley, which extends through the two rich farming counties of Kings and Annapolis, has about a dozen registered men, while the immense stretch of coast between Halifax and the Strait of Canso possesses only four registered men, two of them doctors, and three drug stores. Lunenburg town, with its population of over 4,000, has two druggists, and Antigonish, with 2,000 only, has three stores and six registered pharmacists.

Within the last ten or fifteen years there has been a marked improvement in the general appearance of the country drug stores in most places. The melancholy, dusty, stuffed owls, and the tank of semi-comatose gold fish, have given place to plate-glass windows, goods tastefully displayed or well-cared-for flowers. The old-fashioned round shelfware, with its hand-painted-and-frequently almost illegible-label, has been supplanted by the modern production of Messrs. Whitall, Tatum & Co., Messrs. Parke, Davis & Co., Wyeth, Stearns and other firms have done their share towards modernizing the contents of the store. Our local wholesale houses have met American competition half way, and vie with one another and their rivals across the border in putting up reliable goods in an attractive form. My experience of American drug stores and druggists is somewhat limited, but I think that many of our small towns can boast of pharmacies which will compare favorably with those in larger towns across the border. I have seen a good many English, Scotch and French drug stores in my travels, and compared with the average Nova Scotian pharmacy they are behind the times in equipment, furniture and cleanliness. It must be understood, however, that I have reference to the apothecaries' shops in the small towns; not in the cities.

The status of the apothecary varies somewhat in every town. In Halifax, where a number of the business men spend their time and money along the ways and entertaining the officers of the karrison, the druggists are not as a rule in what is known as "Society." In other places a druggist's position depends almost entirely on himself. If he attends to business, keeps sober, and does not abuse the privilege the law allows him, of dealing in spirits for medical use, by converting his drug store into a bar-room, he takes the same position any other merchant or business man would. The great majority of the profession are perfectly content to be considered what they are, druggists, and have no desire to assume the title of doctor, or to have it conferred upon them by the public, any more than they desire to be called "Captain" or "Judge."

The Pharmaceutical Society admits no diploma but its own, or a physician's, when he is on the medical register of the province. The contention is that any one who has taken the prescribed course of study, and graduated in the United States or England, can pass the examination required by the Provincial Board. This rule may seem a hard one, but in my opinion it is a good one. I have noticed on several occasions that the Era has shown up shortly "colleges of pharmacy" in the Western States. Thus after I graduated I received a very generous offer from a "University of Pharmacy" in the State of Illinois—I regret that I destroyed the circular—to confer the degree of Doctor of Pharmacy on me in consideration of my attending a course of lectures—duration three weeks, and writing a thesis—subject not mentioned. I was also (incidentally) to pay fees aggregating fifty dollars for the dubious privilege of calling myself "doctor," and the conferring upon me by the "University" of a diploma which had no more value or utility than a Confederate note.

Now as to the feeling existing between the medical profession and our own. Taking one district with another, the two professions agree fairly well. In the rural districts the doctors are obliged to carry their own medi-

cine. They may be ten or twenty, or even fifty, miles from a drug store. In the small towns the condition of affairs varies somewhat. When the doctors keep their own drugs and dispense tablet triturates to their patients, or when the druggists indulge in counter-prescribing, and push patent nostrums to the detriment of the doctors, the relations between the two professions are strained. My own experience is that when a doctor finds he has a valuable auxiliary in his apothecary, and when the apothecary sends business to him, instead of taking it away for the benefit of some patent medicine firm, his common sense leads him to form an alliance with him. I regret to say there is still a small number of druggists who habitually prescribe for their customers. Of course any druggist will render assistance in an emergency, or mix a bottle of liniment or syrup for a minor ailment. The most objectionable form of counter-prescribing is undoubtedly in cases of venereal diseases and cases of amenorrhœa, but I think I can say with a clear conscience that only a very small minority of our druggists cater to this kind of trade, or push the sale of patent emmenagogues and "contraband" rubber goods.

The liquor business is another difficult problem in the province. Outside of the city of Halifax there are only some half dozen duly licensed dealers in liquors in the whole province. In many towns, such as Windsor, Sydney, New Glasgow, Kentville and Annapolis the prohibitory law known as the "Canada Temperance Act" is either a dead letter, or is only nominally in force. In a good many places, however, the act is enforced, and in several cases a local license act, even more stringent than the Dominion Act, regulates the sales of intoxicants. The privileges conferred upon druggists by these acts may be briefly stated as follows. First a permit to sell a small quantity of liquor on prescription only, and second, an immunity from seizure by the Inspector of License. Now, I am well aware that many people regard the sale or giving of the smallest quantity of alcoholic liquor under any circumstances, as a mortal sin, but I will leave it to the judgment of any professional man whether it is or is not justifiable to sell a quantity of over ten ounces of brandy, wine, or any other spirit to a person who has driven twenty-five or thirty miles to obtain it for urgent sickness. I remember in the epidemic of la grippe which swept the province in 1890-'91, how people would come for twenty or thirty miles to purchase spirits. In nearly every case they belonged to the most respectable class of the farming and lumbering population. The law forbade me to dispense more than ten ounces at any one time, and I admit that I violated the law every day for at least a couple of months. Furthermore, the local inspector paid me for at least a dozen bottles of spirits out of his own pocket, which he distributed to different people who were in need of medicine. As our liquor laws stand at present they are anything but a success. I do not believe in free liquor and open bar-rooms, nor do I believe in a law which obliges a man who resides a half a day's journey from any drug store to buy liquor for medicinal purposes under the same restraints as the man who resides in the same block with a druggist. Only a person who has actually handled liquor in a drug store can have any idea of the difficulty and trouble of the business; the lies and subterfuges men will resort to to obtain it; the ill will the druggist receives from sots who are on the "dry list," and the temperance cranks who regard any form of alcohol as "anathema maranatha."

As regards the sale of poisons in the province, they are generally sold without any restriction. Each druggist is more or less a law unto himself, and if he chooses to sell morphia by the ounce, or cantharides by the pound, he can do so. A druggist in the gold-mining district told me that in four months he sold twenty seven-pound crocks of potassium cyanide to one company. No register of poisons is kept, and strychnine, arsenic, and other powerful poisons are sold to anyone who is known to the vender as a responsible party, without any demur. It is only fair to add, however, that the number of morphia and cocaine fiends in the province is very small, and that strychnine is used rather largely in the remote rural districts to destroy bears and wildcats, a few of which still remain in the forests.

My ideas of pharmacy may be behind the times—I expect they are—but it is gratifying to me to be able to

say that a large majority of the Nova Scotian druggists live by pharmacy alone. That is to say, they are not obliged to carry paints, oils, seeds, confectionary and toys. About one-third of the stores handle no liquor, or only a very small quantity. There are no departmental stores in the province, but those in Toronto and other places in Ontario send down a considerable quantity of patent medicines, and some drugs. I think, however, that people are getting tired of sending for Paine's Celery Compound and getting some one else's compound after a week's waiting, with perhaps one or two bottles smashed en route, and freight to pay into the bargain. Smaller articles, such as Carter's and Williams' Pink Pills, they do get, and the department stores can well afford to sell them at cost, or under cost, as a "bait."

The Pharmacy Act is stringently enforced all over the province. In settlements where there is no drug store the general store-keepers sell certain articles on the schedule of prohibited poisons without molestation, especially carbolic acid, nitric acid and cyanide (for use in the gold mines), ladanum, acetate of lead, tincture of arnica and oxalic acid. But should there be any drug store within ten or fifteen miles they would not be permitted to handle them at all. The prosecuting power is vested in the Pharmaceutical Society, and they very wisely draw a line between the country store keeper, who keeps a bottle of carbolic acid for veterinary or other use, and the man who wilfully evades both the letter and the spirit of the Pharmacy Act.

In conclusion I would say that besides the druggists whose names appear in the "Gazette" there are at least fifty more in the province who have graduated, and who can at any time register by paying their fees. Many of them have undoubtedly done so since the "Gazette" was published. Possibly some of them have retired from business or are engaged in other pursuits. Taken as a whole the profession is in a healthy condition in this province, and may it long remain so.

COMPRESSED TABLETS AND TABLET TRITURATES.*

BY FRANK EDEL, DES MOINES, IA.

In order to place the pharmacist in position to produce his own tablet triturates, he should first supply himself with at least two, preferably three, tablet molds or plates, viz.: a one-half grain, a one-and-one-half grain mold, and a two-grain mold; or, the one-and-one-half grain mold may be omitted and in its place a one-grain mold be purchased. The smaller mold is for making hypodermic tablets and the smaller forms of tablet triturates, while the other molds will do for almost any tablet of this kind that is likely to be called for. When larger ones are called for, they can be prepared as compressed tablets.

The vehicle almost universally used in making hypodermic tablets is pure powdered cane-sugar, which should be as finely powdered as it is possible to obtain. Formerly some used dried sodium sulfate, but this, while still recommended in some pharmaceutical works, is objectionable because it is not readily soluble when placed in water, takes up a proportion of water of crystallization, and forms a hard, slowly soluble mass. Sugar, however, is readily soluble and answers the purpose admirably. For making other tablets, it is usual to make the vehicle of sugar of milk or, in case the mass is not adhesive enough, with a mixture of milk-sugar and a small proportion of cane-sugar. In case there is a considerable amount of solid extract in the mass, it is best to use a proportion of starch; mix well, and then add the proper amount of milk-sugar or cane-sugar. Where considerable amounts of tinctures are used, it will be found best to use an equivalent quantity of fluid extract, and where this even would be excessive, to reduce cautiously the volume, by evaporation, and then add starch and proceed as above.

Let us suppose that we want to make a hundred tablets of sulphate of morphia, $\frac{1}{2}$ grain, for hypodermic use. We select our one-half grain plate and, having weighed out five grains of sulfate of morphia, we rub it with a small portion of powdered sugar; then we place our plate on a piece of smooth glass or a pill tile, moisten the mass with alcohol, and with a spatula we fill as many holes in

* Portion of an article published in Western Druggist.

the plate as we can, using all the material; next we moisten some powdered sugar with alcohol and take enough of this to fill perfectly twenty holes (the aim being to get experimentally the total weight of twenty tablets), then smooth the surface by rubbing with the spatula, and place the plate on the ejecting plate and eject the tablets. Let stand on the ejectors for a few minutes and when sufficiently dry, remove from the plates and place them in some clean place until thoroughly dry. When dry, weigh them; the weight being the weight of twenty tablets, and deducting the amount of morphine used, we get the weight of sugar that is necessary to make the tablets. Of this we make a note for future reference. In this way we can calculate the formula for any tablet we may wish to make.

A little experience with this work will do a great deal more for the pharmacist in this class of work than anything else, and enable him to make these preparations rapidly and in every way equal to the work done by larger manufacturers.

To make compressed tablets, the first requisite is a tablet machine, and of these there are quite a number on the market. While I have not tried all of them, I will say this much, that with those I have tried I have had no trouble in doing satisfactory work. They range in price all the way from eight dollars up to two hundred dollars for the large power machines. While the ten and fifteen dollar machines do nice work, they do not work automatically, and are consequently not so rapid in their work as those that are automatic in feeding and ejecting. The cheapest good, entirely automatic machine is sold for twenty-five dollars.

In making compressed tablets beginners make the mistake of thinking that it is necessary to have the powder slightly moist, and to this, more than anything else, can be attributed the trouble encountered in the preparation of tablets by compression. The materials to be made into tablets should be in as fine powder as possible, then thoroughly mixed and moistened, and granulated by passing through a No. 16 or 20 sieve and dried. Some preparations will compress nicely and form tablets without any preparatory treatment, but the great majority require special treatment before compression. Such chemicals in granulated form, as potassium iodid, potassium bromid, ammonium chlorid, etc., can be compressed as they are; quinine bisulfate requires only the addition of a suitable lubricant, when it can be compressed, and for this reason it is usually preferred to the sulfate; it also has the advantage of being more soluble. The sulfate of quinine, in common with the great majority of other preparations, requires the addition of some adhesive agent before it can be satisfactorily compressed.

The adhesives used are usually powdered acacia, powdered sugar, and sometimes glucose, the latter, however, being seldom used, as it tends to make too hard a tablet. Sometimes trouble will be found in that the tablets stick to the molds, to guard against which it is often necessary to use lubricants. The lubricants commonly used are powdered talcum not to exceed 2 per cent., powdered boric acid, and a 2 per cent. solution of white petrolatum in ether. Some have recommended the liquid vaseline in ether, but I have not been pleased with that. It should be the aim to use as little adhesive as possible in order to secure satisfactory adhesion in the finished tablet, but where the substance itself is insoluble, as in the case of salol, it is best, in my opinion, to use a considerable quantity of sugar, as this, being soluble and dissolving out, will help to disintegrate the tablet. For tablets such as those made of charcoal it is necessary to use 3 per cent. of acacia and 5 per cent. of sugar, and with the addition of these adhesives in the quantities named, almost any powder can be compressed; but it will not be found necessary in the great majority of instances to use this amount of adhesive. In making tablets containing solid extracts, the extracts themselves often will furnish sufficient adhesiveness, and in this case starch will be found excellent to take up the excess of moisture.

In making tablets it will be found best—although not absolutely necessary when working with a small machine and with a limited number of tablets—to granulate carefully the powders after thoroughly mixing them. This, in a majority of cases, is done by moistening with water and passing through a No. 16 or 20 sieve and then allow-

ing to dry. If this is carefully done, it will often not be found necessary to lubricate the granulated powder before compression.

Where chemical action is likely to be set up in consequence of the solubility of the chemicals in water, it is best to employ some moistening liquid that will not exert a solvent action. In such cases alcohol is generally used, and where this even might be objectionable it is customary to granulate them separately and then carefully mix the several granulated powders. This I generally do by placing them in a dry wide-mouth bottle and agitating them thoroughly.

In making tablets of calomel and sodium bicarbonate I use sugar as vehicle and adhesive, and granulate the calomel with a portion of the sugar and dry. Then I granulate the soda with the remaining sugar and dry. Lastly, I mix the two as above, and, if necessary to lubricate, use a small quantity of powdered talcum, carefully sprinkling it into the bottle containing the powder and agitating until mixed.

The foregoing procedure can be used in making effervescent tablets of citrate of lithium, of lemonade tablets, and other tablets of a similar nature; but generally I prefer to dry the powders thoroughly before mixing; then granulate by moistening with alcohol and dry. As a rule, tablets made in this way will require no lubricant.

To lubricate a granulated powder, it will be found most convenient to use the solution of petrolatum by means of an atomizer and spray the powder, then allow the ether to evaporate, when the powder is ready for compression. Powdered boric acid is to be used with such tablets only as are intended to yield perfect solutions, as in hypodermic tablets made by compression.

Some tablets can be made by simply moistening the powder with water, granulating and drying. Of this kind are tablets of compound licorice powder and tablets of Dover's powder. Tablets containing extract of licorice require no adhesive.

No trouble should be experienced in putting the various medicaments into tablet form, if the pharmacist will but use judgment in the selection of adhesives and care in granulating his powder, and see to it that the granulated powder is dry before beginning to compress. A friend who for several years has been selling a great many tablets of a special kind, lately determined to make them himself, and has bought a power machine. Since then he has turned out about four hundred thousand tablets, and recently informed me that he had had no trouble in doing the work since he had taken the precaution to have his powder dry before compression.

SUBSTITUTION.

Last week's issue of *Printers' Ink* contains this paragraph:

"Mr. George J. Seabury, of Seabury & Johnson, manufacturing chemists and proprietors of several well-known medicinal articles, notably of Benson's Porous Plasters, recently said to *Printers' Ink*: 'In my judgment the reason why liberal advertising in the past five or six years has been reduced to a conservative basis is because of the general substitution of inferior articles for articles of merit. And until the press emphatically condemns this practice I can see but little encouragement. Now let every generous user of the press read between the lines the truths which lie slumbering in these sentiments.' The Little Schoolmaster, after reading between the lines, concluded that if any truths had ever slumbered there they were now slumbering somewhere else."

Wish It Were So.

The Tribune, of Knoxville, Tenn., is seriously misinformed. In its issue of April 18 is gravely told its readers that "a dispenser in the navy ranks as an officer, and braving dangers, which he braves in an engagement, is well provided for by Uncle Sam. He is allowed, besides a good salary, an abundance of money with which to purchase clothing and pin money to the amount of a good salary in itself. His duties are light, and altogether he is as well cared for as are any of the navy." If the Tribune will take the trouble to interview some apothecary in the navy for reliable authentic information, it will find that the above quoted statements are wholly without basis in truth. The apothecary in Uncle Sam's service does not rank as an officer, but is about on a par with the coal-passer.

POISONS AND POISONERS.

There has attached to the subject of poisons from the earliest ages an interest and importance both deep and easily to be accounted for. The mysterious and terrible power of dealing death in a cup of wine, a dish of food, a breath of perfume, even, or by the needle-scratch of a poisoned weapon, all these, combined with the absence of antidotes and the lack of all certain knowledge of the mode of action, the terrible pain and quickly fatal termination of the tragedy, have combined to attract and fix a fascinated attention to the subject.

It would seem that the first poisonous effects noticed were due to blood poisoning from infected wounds. The term "Toxicology" (the science of poisons) is derived from the Greek word for a weapon or blow. The savage probably found that the weapon when stained with the blood of former victims, inflicted more deadly wounds than when clean. The next step would be to smear the blade with all manner of evil-smelling pastes and with the juices of plants deemed unfit for food. Many of these would be quite innocuous, but continual experiments in corpore *vili* would point to the effective ones. Examples of this class of poison still exist in the Wourall poison of the South American natives, described by the great naturalist Waterson as a fearsome mixture of the juice of a poisonous vine containing a substance similar to strychnine, now known to chemists as "curarine," the pounded bodies of red ants, the fangs of serpents, etc. Mystic rites attend the fabrication of the drug; the hut in which the operation is conducted is deserted, all vessels used are burned, and the secret of the process is carefully preserved from coming to the knowledge of the women of the tribe. The last two seem to be reasonable precautions. The natives of the Malay Archipelago use the dried juice of a tree, the *Antiaris toxicaria*, as an arrow poison, and similar compounds are found in use by the Andaman Islanders, the bushmen of South Africa and by the dwarf race described by Stanley in Central Africa.

From the poisoned weapon, dealing its slight, but deadly wound, it is not a long step to the more subtle and much less easily detected method of administering poison in food or drink. Here the limitations are more stringent. Such a poison must have little taste, so as not to excite suspicion at the time of consuming the deadly food or drink. It should be free from any immediate irritant effect, and the symptoms should simulate those of some common disorder. Such a substance has for long ages been known in India, in the *Datura* (Sanskrit, *Dhatorea*) class of plants. Three varieties are common, *Datura alba*, *D. fastuosa* and *D. ferox*. All yield the drug atropine, well named after the eldest of the three Fates, whose duty it is to cut short the thread of life at its appointed place. *Datura* was frequently used in India for the purpose of terminating domestic quarrels, and to this practice may be traced the origin of the custom of "suttee" or widow burning. The Brahmin priesthood, who were also the law-giving class, found that by making a wife's life conterminous with the husband's, the average husband lived considerably the longer. The drug also held an important place as a state agent. The effect of a number of doses insufficient to kill is to cause insanity, thus affording a ready means of rendering harmless subjects deemed too powerful and influential.

The ancient Egyptians were acquainted with prussic acid prepared from peach kernels, as appears from the words, "Pronounce not the name of A. I. O. under the penalty of the peach," declaimed by M. Dutell, on a papyrus in the Louvre. Here is evidently a threat, to such as reveal priestly secrets, of death by waters distilled from the peach kernel, which we know to contain prussic acid. From Egypt the knowledge of the fatal potion seems to have passed to Italy. A Roman knight in the reign of Tiberius, accused of high treason, swallowed a draught of poison and fell dead at the feet of the Senators. Unless we fall back on the theory of some sudden syncope from natural causes, nothing but prussic acid, and that fairly strong, can account for this sudden death. A further example of the use of prussic acid in Rome is the murder of Britannicus by his brother Nero. Hot water was a favorite drink in fashionable Roman circles at this time. One day, after dinner, a slave brings to Britannicus his beverage. It is too hot. Cold water is added, presumably containing the poison. Immediately

on drinking the victim lost power of speech. The breathing ceased. His mother and sister were horror-stricken. Nero, the murderer, looked coldly on, remarking that such fits often happened to him in infancy without evil result. In a minute or two the banquet proceeds. If this, again, were not sudden brain or heart disease, the cause of death must have been prussic acid.

Owing to the loss of the ancient knowledge of anatomy and physiology possessed by the Egyptian embalmers, no post-mortem was possible. In the absence of such knowledge much importance was attached to outward signs. Doubtless many persons must have died from poison, and the reason of their death remained unknown, while others, who died naturally, but whose bodies putrefied rapidly, were supposed erroneously to have died from poison. Indeed, up to the present day there lingers a belief in these outward and visible signs. When Pope Alexander VI. died, probably enough from poison, his body (according to Guicciardini) became a fearful sight, too unclean to describe here. When the Duke of Burgundy wished to raise a report that John Dauphin, of France, had been poisoned, he described the imaginary event thus:

"One evening our most redoubtable lord and nephew fell so grievously sick that he died forthwith. His lips, tongue and face were swollen. His eyes started out of his head. It was a horrible sight to see, for so look people that are poisoned."

In point of fact, these extraordinary symptoms are less likely to ensue in cases of poisoning, for, as a rule, a poisoned man is cut off while healthy, and with his tissues sound and less liable to rapid decay than if he had suffered from disease.

The use of poison is entirely opposed to the Anglo-Saxon habit of thought. To what anger the people were wrought by the detection of poisoners is shown by the execution at Smithfield, in 1542, of a young woman convicted of poisoning three households. She was boiled alive. But at about this time we find the Venetian and other Italian courts formally treating poison as a legitimate method of securing their ends. Especially is this the case at Venice. In the dark records of the "Council of Ten" we find the names of those who voted for and against each assassination, the reasons adduced, and the sum to be paid the agent. For example: On December 15, 1543, a Franciscan brother, John of Raguba, offered a selection of poisons, and declared himself ready to remove any objectionable person out of the way. For the first successful case he required a pension of 1,500 ducats yearly, with an increase of pay for further services. The Presidents, Guandolo Duoda and Pietro Guarini, placed the matter before the "Ten" on January 4, 1544, and on a division (ten to five) it was resolved to accept so patriotic an offer, and to experiment first on the Emperor Maximilian. The bond laid before the "Ten" contained a regular tariff of charges, ranging from 500 ducats for the Grand Sultan to 100 for the Pope and 50 for the Duke of Mantua. The Council appears to have quietly arranged the deaths of many public men. In successful cases we find the single grim marginal note, "factum," accomplished.

The drugs used by the Venetian poisoners are not certainly known. Baptista Porta, writing in 1589, includes a vast mass of information on poisons in the cookery section of his book on "Natural Magic." It seems to be an open question whether cooks most needed a knowledge of poisons, or poisoners a knowledge of cookery. We have a more certain knowledge of the methods of the Italian schools of the sixteenth and seventeenth centuries. The iniquitous Tofana made solutions of white arsenic of various strengths and sold them as "Acquetti di Napoli." She is said to have poisoned more than 600 persons, including two Popes, Pius III. and Clement XIV. The composition of the Acquetta di Napoli was, for a long time a secret, shared, strange irony of fate, by the reigning Pope, and by the Emperor Charles VI. The "Acquetta di Perugia" was another choice preparation. Its manufacture is thus described: "A hog was killed and cut into joints, which were rubbed with white arsenic. The juice which dripped from them was preserved and accounted far more deadly than the ordinary arsenical solution." In view of the recent work on bacteriology, this seems extremely likely. Seechl has actually succeeded in preparing highly poisonous organic compounds of arsenic by

allowing animal matters to putrefy in contact with white arsenic; the liquids swarm with bacteria. The talented lady who dispensed this brew was arrested in 1709, but, availing herself of the protection of the Church, continued to sell her wares unmolested for nearly twenty years longer. She taught her art to Hieronyma Spara, who formed an association of young married women, in the papal reign of Alexander VII. for criminal purposes. They were detected and convicted on their own confession. The persuasive measures employed to secure confession have not been officially recorded! It would almost seem as if "suttee" might well have been introduced into Italy three hundred years ago.

In the letters of Mme. de Sevigny, and in Voltaire's "Siècle de Louis XIV.," are written accounts of another school of poisoners, that of St. Croix and Mme. de Brinvilliers, the pupils of Keli. The lady appears to have been as cold blooded as Tofana. She made experiments on the patients in the Hôtel Dieu, in order to test the strength of her preparations, and invented "les poudres de succession," an arsenical preparation. She poisoned her father, brothers, sister, and others of her family. St. Croix was killed by the fumes of a preparation on which he was engaged. Mme. de Brinvilliers was detected, but sought safety in a convent. She was enticed thence by a police officer disguised as an abbé. She was afterwards beheaded and burnt near Notre Dame.

Since the times of Tofana, Keli, and St. Croix, such progress has been made in pathology and analytical chemistry as to render a repetition of these crimes impossible, by making detection certain. Arsenic, the darling of the medieval poisoners, is rendered worse than useless by the delicate tests which have been placed in the hands of the expert. Chemical research has indeed placed new and subtle weapons in the hands of the poisoner, but it has rendered his detection inevitable. (Pharm. Jour.)

PHARMACY.

ointment of ALUMINUM ACETATE.—Solution of aluminum acetate 40 parts, lard 20 parts, olive oil 7 parts and yellow wax 3 parts. (Ph. Centralh.)

IODALBACIDES are a class of preparations obtained by the splitting up, by means of alkali, of synthetically prepared iod-albumins. They are free from sulphur combinations and have the properties of weak acids. Their therapeutic action is supposed to be analogous to that of thyroïdine and other preparations of the thyroid gland, but more vigorous. (Ap. Ztg.)

CHEMICALLY PURE IODINE is best prepared, according to Ph. Ztg., by heating cuprous iodide in a current of dry air at 220° to 240° C. and condensing the vapors of iodine formed. The product is absolutely pure, entirely volatile at 70°, and in appearance is black and opaque. In 18 hours 85 per cent. of the iodide is converted into iodine, the remaining 15 per cent. is decomposed only with difficulty.

JOHIMBINE BARK.—According to M. L. Spiegel this drug is largely used by the natives of the Cameroun as an aphrodisiac. It contains 2 alkaloids, called by Spiegel johimbine and johimbenine, of which the first only can be considered the true active principle of the bark. No precise data as to the pharmacological and therapeutical properties of the new alkaloid are yet at hand. (Chem. Ztg.)

COATING PILLS WITH SALOL.—As the coating of pills containing resins in the ordinary manner with salol is difficult, and the use of salol-collodion or an ethereal solution of salol tends to soften the pills, a writer in Jour. de Ph. recommends immersing the pills, after removing all powder from the surface, in a bath of fused salol, taking out quickly, and agitating briskly in a large capsule until the coating hardens.

SOLUTION OF IODINE ON OILS.—For the rapid solution of iodine in cod liver or other oils, A. Schmitt recommends to proceed as follows: One gm. of iodine and 0.25

gm. of sodium iodide are rubbed up with a few drops of glycerine until complete solution of the iodine has taken place. The oil is then incorporated with the mixture. The whole operation requires only a few minutes, and the solution is complete. (L'Union Ph.)

DETECTION OF PARA-AMIDO-PHENETOL IN PHENACETINE.—Rental gives the following simple test for this dangerous impurity: Place a little of the phenacetine to be tested into a porcelain capsule, add some chlorate hydrate and fuse the mixture. In presence of para-amido-phenetol a violet color appears within a short time, varying in intensity with the amount present. (L'Union Ph.)

EMULSION OF CASTOR OIL.—To deprive castor oil of its disagreeable taste, a method of emulsification, employed by the Arabs, is recommended: Into a glass of milk put 15 to 20 Gm. of castor oil and warm the mixture while stirring. In a few minutes the emulsion is complete and is flavored with orange juice. The oil is in this form not only more palatable, but also much more effective, as the above mentioned quantity is quite sufficient for an adult. (Il. Farm. Ital., through Ztsch. f. Ph.)

PREPARATION OF CAFFEINE AND SODIUM BENZOATE.—When this compound is prepared by dissolving sodium benzoate and caffeine in definite quantities of hot water, it frequently happens that a precipitate is formed on cooling of the solution. According to Rolla (Boll. Chim. Farm.), this is due to the fact that sodium benzoate not seldom contains sodium carbonate as an impurity, and he therefore recommends to neutralize this with benzoic acid before addition of the caffeine. (Ztsch. f. Ph.)

PRESERVATION OF PROTARGOL SOLUTIONS.—It has been found that bottles of dark amber glass do not prevent darkening of a 1.5 per cent. solution of protargol, when kept exposed to daylight. On the other hand it is stated that even solutions of 5 to 10 per cent. strength keep perfectly for months when stored in bottles of black glass. This observation is of particular interest, since the use of protargol for ophthalmological purposes necessitates keeping it on hand in rather concentrated solution. (Ztsch. f. Ph.)

SYRUP OF IODIDE OF IRON.—Carles (L'Union Ph.) has made parallel experiments on the keeping qualities of the syrup as prepared by three different methods, (1) with simple syrup, acidulated with citric acid, (2) with syrup of orange flowers, and (3) with syrup of acacia. He reaches the conclusion that simple syrup is the best preservative. The syrup should be concentrated, prepared from pure sugar with distilled water without using egg albumen for clarification, and slightly acidulated with citric acid. Syrup of acacia should not be used, as the gum has the action of oxidizing ferments and therefore incompatible with ferrous iodide.

MEDICINAL VALUE OF OLIVE OIL.—Medical authorities are generally agreed as to the value of olive oil medicinally, finding it also a potent agent for any defects of the excretory ducts, especially the skin; eczema has rapidly disappeared upon a discontinuance of starch foods and the substitution of a diet of fresh and dried fruits, milk, eggs and olive oil. The beneficial effects of the latter, when thus taken in conjunction with a fruit diet, have frequently been remarked in respect to the hair, nails and scalp, quickly cleaning the latter of scurf, and supplying to the sebaceous glands the oily substance which they secrete when in a healthy condition, and the absence of which is the cause of debility of the hair, frequently ending in baldness. It has long been observed that those who treat olive oil as a common article of food, and use it as such, are generally healthier and in better condition than those who do not, and its therapeutic and prophylactic properties are very favorably regarded by medical men. It is known to be destructive to certain forms of micro-organic life, and for the eradication of such from the system its internal use has been successfully resorted to (Sci. Am.)

AMMONIUM SULPHO-ICHTHYOLATE IN PULMONARY TUBERCULOSIS.—Bignone (Rev. Sc. Med.)

employs with success the following combination: Ammonium sulpho-ichthyolate 10 parts, glycerin 20 parts, and mint water 10 parts. The treatment is begun with 10 drops of the mixture in 300 Cc. (10 fl. ozs.) of water, which is taken within 24 hours. The dose is increased by 5 drops daily, until 200 drops are taken in 24 hours. Even this dose may be exceeded without danger. The author reports very favorable results, and explains the utility of ichthyl in such cases as due to its antiseptic properties and the favorable effect it exerts on the nutrition of tuberculous patients. (L' Union Ph.)

ANESIME is a trade name for tri-chlor-pseudo-butyl alcohol or acetone-chlorform, which has been brought out as a local anæsthetic. After establishing its anæsthetic powers and non-toxicity on animals, experiments were made with 1 to 2 per cent. solutions on human subjects. It was found useful in affections of the nose and larynx, in ophthalmology, minor surgery, and dentistry. Without being comparable to the effect produced by a 5 per cent. solution of cocaine hydrochloride, it has sufficient anæsthetic power to permit many operations. The solution has no irritating action on the eyes, does not affect the iris, and causes no general inconvenience when injected in quantities of 10 to 12 Pravaz syringes full. (Med. Woch., through L' Union Ph.)

ESSENCE OF PEPTONATE OF IRON.—In Ph. Rundschau, the following method of preparation is recommended: Dissolve 8 parts of dry peptone in hot water and after cooling gradually add, with stirring, 174 parts of solution of chloride of iron. Wash the precipitate, which is formed, with water, until the washings no longer react with silver nitrate, and drain it on a cloth strainer. Then mix it with 200 parts of simple syrup and bring it into solution by addition of 90 parts of a solution of soda (1-10 official strength) and heating. After cooling add 100 parts of alcohol, tincture of orange 3 parts, aromatic tincture and tincture of vanilla, of each 1-5 part, acetic ether 5 drops for each 100 Gm. and water sufficient to make 1,000 parts. The product is a clear liquid of a brown-red color and contains 0.6 per cent. of iron. It must be protected from light.

COD LIVER OIL WITH IODIDE OF IRON.—For the preparation of a 0.2 per cent. solution of ferrous iodide in cod liver oil Renesse (Ap. Ztg.) proposes the following method. Place 0.6 part of powdered iron into a porcelain dish with 2 parts of water and gradually add 1.64 part of iodine. When the formation of ferrous iodide is complete, evaporate rapidly to dryness with continuous stirring, triturate the residue to a very fine powder and place it in a dry receptacle with 98 parts of cod liver oil. After 24 hours maceration, and frequent shaking without warming, which would give the oil a disagreeable odor and taste, the iodide will have entered into solution with partial decomposition. Then filter the oil and make the filtrate up to 1,000 parts with cod liver oil. The product contains 0.2 per cent. of ferrous iodide and has a light red-brown color.

PREPARATION OF OLEATE OF MERCURY.—The following method is recommended in Ph. Rundschau: Mix 25 parts of yellow oxide of mercury in a porcelain mortar with 25 parts of alcohol, and add 75 parts of oleic acid. Triturate the mixture until it becomes sufficiently thick so that the heavier particles of oxide no longer deposit at the bottom. Let it stand 24 hours, then heat to 60° C. and triturate, continuing the heat, until the weight of the product is 100 parts. The mass so obtained is semi-transparent, of a light-yellow color and the consistency of an ointment. It retains the odor of oleic acid. It is slightly soluble in alcohol and ether, more readily in benzene, and very easily in fixed oils. If 1 Gm. of oleate of mercury be mixed with 10 Gm. of crushed glass, 20 Gm. of dilute alcohol added, and the mixture heated at 33° to 40° C. for 1 hour, with frequent shaking, 10 Gm. of filtrate, on evaporation to dryness on a waterbath, should not leave more than 0.06 Gm. of residue. If 1 Gm. of oleate be boiled with 5 Gm. of concentrated nitric acid for a few minutes, then 5 Cc. of water added, and the mixture filtered when cold, no precipitate should form in the filtrate, on the addition of 3 times its volume of dilute sulphuric acid.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc. Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

A German Horse Blister.

(B. W. B.) The German prescription you submit is written in pencil and so illegible we cannot reproduce it. The mixture is evidently intended as a veterinary "blister," the formula being translated by an expert, as follows:

Powdered cantharides	1 ounce
Powdered euphorbium	1 dram
Powdered opiment	12 grains
Spirit ammonia	2 ounces
Spirits turpentine	5 ounces

Mint Frappe for the Fountain.

(E. C. F.)

(1) Raspberry vinegar	4 ounces
Fruit acid	1½ ounces
Extract Jamaica ginger	2 ounces
Tincture capsicum	2 to 4 drams
Soda	3 fl. drams
Rock candy syrup	1 gallon

To serve, use 12 ounce glass. Take of above syrup about 2 ounces; fill glass with shaved ice; add three or four sprigs of fresh mint, and with mixing spoon press to side of glass to get flavor. Add more ice until glass is about two-thirds full, then fill with soda. Top off with a few sprigs of mint and serve with straws.

The Standard Manual of Beverages is authority for this one:

(2) Ginger essence	¼ fl. ounce
Tincture of capsicum	½ to 1 fl. dram
Brandy	1 fl. ounce
Solution of citric acid	2 fl. drams
Raspberry vinegar	1 fl. ounce
Syrup, enough to make	32 fl. ounces

The capsicum may be omitted if the ginger essence is considered strong enough. Serve as in the preceding.

Perfumes for Hair Oils and Pomades.

(W. L. R.) The Era Formulary gives these:

(1) Heliotropin	8 grains
Coumarin	1 grain
Oil of orris	1 drop
Oil of rose	16 minims
Oil of bergamot	32 minims
Coumarin	2 grains
(2) Oil of wintergreen	2 drops
Oil of cloves	4 drops
Oil of cassia	4 drops
Oil of lavender flowers	16 minims
Oil of lemon	48 minims
Oil of bergamot	72 minims
(3) Liquid storax	14 drams
Oil sassafras	14 drams
Oil clove	6 drams
Oil orange	6 drams
Oil lemon	3 ounces
Oil bergamot	3 ounces
(4) Balsam Peru	30 parts
Oil bergamot	30 parts
Oil petit grain	31 parts
Oil clove	60 parts
Oil lavender	82 parts
Oil lemon	93 parts
Tincture ambergris	125 parts

Potassium Chlorate, Tincture of Ferric Chloride and Spirit Nitrous Ether.

(S. B.) asks criticism upon the following:

Potassium chlorate	16 grains
Tincture ferric chloride	2 scruples (?)
Tincture digitalis	½ dram
Spirit nitrous ether	3 drams
Compound mixture glycyrrhiza	1 ounce
Simple syrup	14 ounces
Water, enough to make	16 ounces
Mix, shake	One dram every 3 hours.

There are several incompatibilities in this prescription, each depending upon the order in which the ingredients are brought together. Thus, potassium chlorate is incompatible with tincture of digitalis, spirit nitrous ether (forming peroxide of chlorine, etc.), compound mixture of glycyrrhiza, and syrup. Tincture of ferric chloride is in-

compatible with the tannin of tincture of digitalis and the mucilage of acacia forming part of the compound mixture of glycyrrhiza. Spirit of nitrous ether is also decomposed by potassium chlorate, tincture of digitalis, etc. The quantity of tincture of ferric chloride directed above is evidently a mistake on the part of the prescriber, as it is hardly probable he intended the tincture to be weighed out. The prescription should not be dispensed.

Essence of Ginger Compound.

(R. P. C.) The formula you submit may be prepared as follows:

Jamaica ginger	3 ounces
African ginger	3 ounces
Capsicum	1 ounce
Alcohol	25 ounces
Water	75 ounces
Caramel, enough to color.	

Reduce the ginger and capsicum to a moderately coarse powder, moisten with two ounces of alcohol and pack firmly in a cylindrical percolator; now add enough alcohol to saturate the powder and leave a stratum above it as in the preparation of fluid extract of ginger. Macerate for forty-eight hours, then allow percolation to proceed, gradually adding alcohol until 25 ounces of percolate have been obtained. Transfer the percolate to a glass bottle of suitable capacity and add to it six ounces of pumice stone in moderately fine powder; shake the mixture thoroughly and repeatedly during twelve hours. Then add the water in portions of three or four ounces, shaking well after each addition. When all is added, repeat the agitation occasionally during twenty-four hours, then filter, returning the first portions of the filtrate until it runs through clear. Instead of pumice, magnesium carbonate, talcum, precipitated phosphate of calcium, lime, etc., may be employed.

Milky Mixture of Magnesia.

(J. F. C.) We cannot give the formula for the proprietary article. According to Hager, an aqueous hydrate or milky mixture of magnesia may be prepared as follows:

Magnesium sulphate, crystals..... 6 parts

Distilled water..... 20 parts

Filter, heat to the boiling point and gradually add, under constant stirring:

Solution of potassa enough to produce an alkaline reaction.

Transfer the precipitate to a filter and wash thoroughly with hot distilled water. To the washed magma add sufficient cold distilled water previously deprived of air by boiling, to make the whole weigh 20 parts. One hundred parts of the mixture contain 5 parts of anhydrous magnesia.

Another method is to triturate 10 parts of light calcined magnesia with 70 parts of hot water, and then digest in a closed vessel on a steam-bath for half an hour. Finally add 70 parts of water. These milky mixtures of magnesia are apt to assume a gelatinous consistency after standing for some time.

A "glycerinated" mixture may be prepared as follows:

Calcined magnesia.....	10 grams
Triturate and mix with hot distilled water.....	100 grams
Then add	
Best glycerine.....	40 grams

Treatment for Inebriety.

(A. B. C.) The treatment for inebriety should be outlined by a competent physician, and his instructions closely followed. It is not within the pharmacist's province to prescribe for this or any other disease, and you should go slow in recommending any remedy for specific cases. As a matter of general information, however, a cure for the drink habit from the physician's standpoint lies in the correction of the physical conditions creating the affinity for stimulants, and in the production of a positive physical and mental state leading to complete abhorrence of alcoholic liquors. Dr. J. W. Reed would place the drinker in one of three categories; 1st, the primary or tipping state; 2nd, habitual drunkenness; 3rd, alcoholic organic disease and physical decline. He also divides cases into sthenic and asthenic, morbid physiological constitution constituting the first and second stages, and the pathological or lesionary state the third stage. In the first and second stages in sthenic cases he administers 1 fl. dram of aromatic spirit of

ammonia in water, every three to four hours, and sometimes adds 3 drops of aconite tincture, also 8 to 10 drops of digitalis tincture (if the heart action indicates it) for the first day or two. Administration of atropine will afford the higher cerebral centers rest for some time. For mental disturbance ammonium valerianate is freely used. The author recommends, for physiological recovery, electricity and nuxvomica; also cold in extreme cases. Such treatment will ordinarily bring the case to restitution in a week; but it is urged that this treatment be continued for fully another week, and the patient be watched for still another week.

To prevent return to the drinking habit, he must continue taking medicaments that will afford him physical support and energy. The author's experience appears to have convinced him that physical energy is best obtained in these cases by employing hypophosphites. For disturbed digestion koumyss is recommended. Bitter tonics, frequent electrical and hot baths, massage, moderate exercise, rest and sleep are important in the first and second stages of asthenic cases. Organic alcoholism, waste of nerve tissue, breaking down of all physical powers, are the lessons of the third stage. To establish healthy action and recovery is the work of many months. Such patients should be kept in touch with their physicians for from two to twelve months.

In the matter of specific treatment, Dr. Edward C. Mann, Brooklyn, N. Y., some years ago recommended the following as a good tonic:

Sulphate of quinine.....	2 grains
Zinc oxide.....	2 grains
Sulphate of strychnine.....	1-10 grain
Arsenic.....	1-100 grain
Capsicum.....	2 grains

Mix and make into one pill.

Together with this pill, Dr. Mann uses, for sixteen days, the following hypodermically:

Strychnine nitrate.....	1 grain
Distilled water.....	1/2 ounce

Dose.—Eight minims daily for eight days; 4 minims daily for another eight days. To quiet the morning nausea of alcoholics, 2 or 3 drops of wine of ipecac on the tongue, fasting. To induce sleep, the following sedative is administered at night for a few days:

Deodorized tincture of opium.....	2 drams
Fluid extract of hyoscyamus.....	2 drams
Chloral hydrate.....	2 drams
Potassium bromide.....	2 drams
Tincture capsicum.....	1/2 dram
Tincture aconite root.....	5 minims
Peppermint water, to.....	4 ounces

Dose.—Two tablespoonsful at bedtime for a few days only, freely diluted with water.

If the patient is very much excited and is bordering on delirium tremens, the following is useful for two or three nights.

Hyoscin hydrobromate.....	1 grain
Distilled water.....	9 drams
Alcohol.....	1 dram

Mix and make a hypodermic solution.

Dose, from 5 to 10 minims.

STABLE SOLUTIONS OF IODINE IN MINERAL OILS.—Most of the solutions of iodine in mineral oils so far known are very unstable and therefore unsuited to medicinal purpose. A new, patented process of preparation consists in subjecting the oil to an oxidation process before dissolving the iodine. From 2 to 7 per cent. of alkali, either in solid form or in concentrated solution, is added to the oil and it is then treated with oxygen at a high temperature and under pressure. The heat may be raised to 200° C. Heavy mineral oils of specific gravity 0.89 to 0.9 are most suitable, also purified paraffin oils and vaseline. By this treatment a product is obtained that forms a permanent emulsion with water. This emulsifying power is the test of complete conversion. The solution of iodine in this product is effected by mixing and heating under pressure. The proportion of iodine usually taken is 6 per cent. With some oils, which present difficulties, it is advisable to use a little fat or oil. It is also necessary in some cases to employ high pressure, up to 30 atmospheres. (Ph. Rundschau.)

CREOSOTE PILLS.—The following formula is offered in Jour. de Ph. Take of creosote 10 Gm. (154 grains), powdered licorice root 20 Gm. (308 grains), fresh egg albumen, a sufficient quantity, about 5 Gm. (75 grains). Make into 100 pills.

THE PHARMACEUTICAL ERA

[WEEKLY]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, MAY 12, 1898.

No. 19

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates: U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, \$4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483,
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 124 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE
EDITORIAL..... 695	Banquet of the Bowlers..... 716
CORRESPONDENCE..... 697	Substitution in St. Louis;
Are We Built Up Like	Detroit Firm Embar-
Crystals?..... 698	assed: Protest Against
ERA COURSE IN PHAR-	Curtailment of Postal
MACY..... 699	Deliveries..... 718
Inorganic Chemistry..... 699	Million and a Half of Pre-
Pharmaceutical Processes. 701	scriptions: Are Said to Be
International Hygiene	Dyspeptic: A Scheme
Congress..... 705	That Did Not Work..... 719
Some Thoughts, Sugges-	NEWS LETTERS..... 719
tions and Advice..... 706	BUSINESS RECORD..... 724
In the Land of Ginger-	ASSOCIATIONS.
Jamaica..... 707	BOARDS, COLLEGES..... 727
PHARMACY..... 709	DRUGGISTS' ADVER-
QUESTION BOX..... 711	TISING..... 729
NEWS AND TRADE DE-	OBITUARY..... 732
PARTMENT..... 713	PATENTS, ETC..... 732
War Revenue Stamp Tax. 713	STATE OF TRADE..... 732
Action of the Proprietary	MARKET REPORTS..... 734
Association..... 714	

THE NEW ERA PRICE LIST.

Just as we had finished, ready for the printer, the compilation of the Era Price List of drugs, chemicals and patent medicines, which had been promised to our subscribers, there arises the certainty, or at least the probability, that the proposed Internal Revenue Stamp Act, now under discussion at Washington, will, when passed, necessitate a very radical revision of the prices on a great majority of the proprietary articles included in this list. Until this matter of the future prices of these goods is definitely settled by a revision of manufacturers' and jobbers' prices, it would be unwise to publish this Era Price List, and we accordingly announce its postponement a short time longer. While this delay is regretted, its wisdom and necessity will be recognized by our readers, who will appreciate the more a Price List which is first available in the event of changes in prices.

STAMPING GOODS IN STOCK.

The more one studies the possible effect of that provision of the proposed War Revenue bill which stipulates that dealers must purchase stamps and affix them to all goods in stock, the more far-reaching and dangerous its possibilities seem to be.

According to records compiled from the commercial agency books, there are in the United States:

Wholesale and retail grocers.....	110,000
General stores.....	105,000
Wholesale and retail druggists.....	30,000
Dry goods stores.....	25,000
Tobacco and cigar dealers.....	25,000
	335,000

It has been estimated that the average drug stock will require \$100 worth of stamps to cover it. One small jobbing druggist announces that after a very careful estimate of his stock, he finds he will have to invest \$2,500 in stamps. The grocery and dry goods trades will not have to invest so much proportionately, but, placing the average at the low sum of \$50 per dealer, it makes a grand total of over \$15,000,000 in cash which must be suddenly withdrawn from trade and turned over to Uncle Sam for stamps.

In addition to this estimate, should be mentioned the 100,000 liquor dealers and all the little confectionery and fancy goods stores, which carry more or less of these goods, which would be subject to tax. Further, the increase in the license for selling tobacco and cigars, the stamps which every business firm must purchase for the tax on checks, etc., the money required to purchase stamps for legal documents, and the larger sums which manufacturers of proprietary goods must pay out, it is certainly a low estimate to state that \$25,000,000 will be suddenly withdrawn from the commercial interests of this country.

A very small proportion of the retail dealers throughout the country have the ready cash to spare for the purchase of these stamps. If they have to put up this money, it simply means that some other creditor must wait, and as a rule that creditor will be the jobber. The jobber in turn will come back at the manufacturer with excuses why he cannot pay his bills, and the result must be a very serious interference with business, a large number of failures, and, as some of our best business men believe, a commercial panic may be precipitated.

The possibilities of these dangers must be apparent to the members of Congress who have this matter in charge, and we shall be very much surprised if this provision of the law which requires the stamping of goods in stock is not modified. It will certainly give the Government all the revenue required if a stamp is attached to each package when an actual sale is made. With such a provision, every little dealer can invest in a few dollars' worth of stamps and go on with his business. The grand total will be sufficient to give Uncle Sam all the money he requires, will save an endless amount of unnecessary work, and will avoid the necessity of affixing stamps to dead stock, of which every dealer has more or less.

There is one other feature of the law to which we would invite attention, that is, the provision that

each manufacturer must go before an Internal Revenue collector each month and make an affidavit that he has complied with the law. The framer of that clause evidently overlooked the fact that practically every little retail druggist is a manufacturer, more or less. This is also the case with many small grocers and other dealers. To compel all these little manufacturers, who may make a few dollars' worth of goods each month, to go before an Internal Revenue collector, who may be located miles from their places of business, would be a hardship which no sane lawmaker who has a comprehension of the existing circumstances would impose.

If the members of the committee having this matter in charge have awakened to the danger of compelling merchants to stamp goods in stock, and are going to omit this feature of the bill, they ought to announce that fact to the country at large through the press. Hundreds of thousands of dollars' worth of orders are being held up to-day awaiting the decision of Congress upon this one point. We are all patriotic, and we are all perfectly willing to pay our share of the tax necessary to give Uncle Sam all the money he requires to put up the greatest fight the world has ever seen, but our lawmakers should exhibit their common sense, and not interfere with business unnecessarily, as they are doing at present.

Druggists Are Patriotic.

While all classes of business men have shown their enthusiasm and patriotism in the crisis now upon us, none are more conspicuous than the members of the drug trade in its several branches. From the druggists are drawn fighters, apothecaries and hospital stewards, and in many cases druggists have been the ones who set on foot movements for taking care of those who are left behind by the departure of their protectors and supporters for the seat of war. It is impossible to make even the barest mention of the many instances of this character continually coming to notice, but a few may be singled for mention as indicating the feeling of all. In the educational institutions, colleges of pharmacy, nearly every graduating class has furnished this year members who will serve Uncle Sam in either army or navy. At one college such servants had even secured appointments before receiving their diplomas, and appeared to claim the latter dressed in the full uniform of service. At another college the dean of the faculty enthusiastically led the immense audience witnessing the commencement exercises in the singing of the Star Spangled Banner, and at its close called for three cheers for our chief executive, the President, which were rendered with a will and heartiness significant of the people's support in this time of need.

In commercial circles, among the jobbing drug houses, in the pharmaceutical and proprietary medicine manufacturing firms, the same spirit of patriotism is manifest. Many a firm assures those of its employes who may be called upon to serve their country that their places will be kept open for them, that their families will receive full pay during their absence, and that after hostilities have ceased, the employes may return to their former positions, or even better ones.

Among the retailers, employers themselves have enlisted, or have responded to the call upon the State troops for service; clerks have volunteered, and, all in all, the retail druggist, who has often been considered a long-suffering, down-trodden, patient and spiritless individual, has shown that he possesses the same martial spirit which actuates us all.

But while we commend those who take an active

militant part, none the less of praise and commendation must be accorded those who try to make it easy and comfortable for those who must stay at home. As an instance, the pharmaceutical society in a Michigan city has established a precedent which is commended to other organizations for imitation. It has formed among its members a society to contribute regularly once a month an amount to a general fund to provide for the maintenance of the families of the soldiers and sailors from that city. This fund will be distributed in a systematic manner, and the contract holds good until the end of the war with Spain.

It is not amiss, either, to call attention to the fact that the drug trade, beside contributing of its heart and of its body, will go down into its pocket as well. The proposed Revenue Stamp Act will lie heaviest upon the drug trade, but all members of this trade announce their perfect willingness to carry the burden in view of the emergency which necessitates its imposition.

How It Is Done.

An anonymous correspondent sends us from Pittsburgh some printed and typewritten matter, from which the firm names, addresses, letter heads, etc., have been carefully removed, relating to the operations and methods of Canadian dealers in phenacetine and other contraband goods. These dealers, in addressing some United States patron (possibly our anonymous friend), write him as follows:

Dear Sir—We have shipped you goods as enclosed invoice, all charges paid as per your order of March 29th.

We have taken the label and wrapper from the package of Phenacetine; please find them enclosed. We did this as the U. S. Customs are delaying Phenacetine shipments from four to six weeks on account of U. S. patent.

Kindly excuse the delay, but it was unavoidable.

Trusting that this will meet with your approval and thanking you for the order, we remain,

Yours truly,

There is nothing particularly interesting or hitherto unknown in all this, but it serves to emphasize the fact that there is a good deal of this sort of trading in illegitimate goods being carried on. It is merely a case where the individual considers himself perfectly right and justified in his actions, though the United States Government by its laws may hold that he is wrong. A modification of our patent and trade-mark laws whereby they may be made to apply a little more rationally and justly, and admit of none of the abuse and misapplication now characterizing their enforcement, is emphatically called for, as is proven no better than by the rancorous discussion and litigation over phenacetine and other protected articles of allied nature. A good subject here for the A. Ph. A. to tackle and fight to a finish.

Our Trade With Spain.

Our exchanges with Spain just now are of a kind in which we are desperately anxious to get all the advantage and give nothing in return. In anticipating the outcome of this state of affairs there is more than usual interest in Bulletins Nos. 11 and 12, issued within the last few days by our Agricultural Department. These publications give statistics bearing upon Spain's foreign trade and our trade with that country, and furnish a basis for some figuring on gains and losses. Thus, if we are to acquire the Philippines and keep an eye on Cuba and Puerto Rico, the trade they have heretofore done with Spain is a matter of interest.

It appears from actual figures that our trade with Spain has been gradually shrinking for about fifteen years, 1897 showing a decline of over a million dollars

as compared with 1896, the figures for the two years being \$14,544,718 and \$15,623,612 respectively. The exports and imports were affected about equally, and the balance in trade has been largely in favor of the United States, the merchandise we send to Spain being nearly three times greater in value than of that received in return.

Of the agricultural products received from Spain, the following are in the order of their importance: Fruits, nuts, wine, argols, hides and skins and vegetable oils. Almonds are the principal nuts, and the trade has increased during the last ten years, the average annual value being \$414,533 during 1893-1897, as against \$379,302 during 1888-1892. Argols, or crude cream of tartar, has also largely increased in trade during the last five years. From 1888 to 1892 the imports averaged 171,399 pounds, valued at \$17,328, while from 1893 to 1897, the annual average was 1,639,726 pounds, valued at \$150,012.

Classed with non-agricultural products are several imports of interest to druggists. One of these is cork bark, and our purchases during the last five years have amounted to nearly \$500,000 per annum, and imports of manufactures of cork bark have increased, while those of the crude bark have declined.

In the class of merchandise known as drugs, chemicals, etc., glycerin is the most important article, the imports averaging 1,622,827 pounds a year during 1893-1897, as against 611,046 pounds a year during 1888-1892. The imports for last year, however, amounted to only 642,174 pounds. The imports of licorice root have been declining. During 1888-1892 the annual imports averaged 4,409,337 pounds, worth \$117,270, and during 1893-1897 they fell to 3,262,023 pounds, worth \$99,771, those for last year falling to 2,222,982 pounds, valued at \$60,515. The total importations of drugs, chemicals and dyes increased from \$246,036 per annum for 1888-1892 to \$355,834 per annum for 1893-1897.

Of our exports to Spain, agricultural products comprise fully 85 per cent., and 90 per cent. of these are cotton and tobacco, the other products being wheat, wheat flour, corn, lard, tallow, etc. Drugs, chemicals, dyes and medicines are hardly worth mentioning in the exports, as they amount to only \$30,478 per annum during the past five years.

The combined import and export trade of Spain with the principal countries averaged annually as follows during the years 1891-1895: France \$98,019,295 (31 per cent.); United Kingdom, \$69,473,567 (22 per cent.); Cuba, \$32,139,518 (10 per cent.); United States, \$19,916,075 (6.32 per cent.); Portugal, \$12,371,115 (3.93 per cent.); Puerto Rico, \$9,556,577 (3.03 per cent.); Philippine Islands, \$8,467,013 (2.69 per cent.).

Of the goods imported into Spain during these five years, the United States furnished on an average annually \$17,101,983, or 10.34 per cent.; Cuba, \$7,380,418, or 4.46 per cent.; Puerto Rico, \$4,357,571, or 2.64 per cent.; the Philippines, \$4,219,699, or 2.55 per cent. Of Spain's exports during the same period the United States took \$2,814,092, or 1.88 per cent.; Cuba, \$2,759,100, or 16.53 per cent.; Puerto Rico, \$5,199,006, or 3.47 per cent.; Philippine Islands, \$4,274,314, or 2.84 per cent.

Karabougas Bay, the large inlet on the eastern side of the Caspian Sea, has been found to have a crust of crystallized Glauber salts a foot thick on its bottom. The bay is nearly opposite Batoum, whence fuel can be obtained easily, and factories for the production of sodium sulphate are to be established soon on a large scale.

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

EFFECTS OF LONG HOURS IN THE DRUG STORE.

To the Editor: New York, May 5, 1898.
At the end of the first year's skirmish and at the dawn of the second year's determination to establish the prerogative to shorter hours in pharmacies, I feel constrained to thank the Era for its most unbiased reports of the League's doings; not that I wish it to be assumed that these were always what I had hoped, but that they were the most just and numerous as compared to its contemporaries. Neither do I write with the purpose of offering an apology for the mode of procedure pursued in bringing about eventually the hoped-for desideratum, as the correctness of that will be established by time, but with the view that those interested, either for or against the endeavor, will make a comparison of their condition with that of those engaged in any other advanced vocation, and ask themselves if the retrogression in pharmacy, physically, socially and commercially (the latter indicated on the mortgage files in the City Hall), if this decay is not due to the excessive hours of confinement and the attendant isolation.

On the one side, isolated from family, friends and the public in general, except so far as necessity compels their visits to the pharmacy, can other-wise be expected than a pessimistic view of life's purposes, and on the other, the development of an idea of exalted opinion of self-assumed importance, and in accordance with which an imaginary elevation to a resplendent and pride-built pedestal of hazy superiority?

That numerous cases of retrogression do occur, both in the individual and the business in general, I positively know from observation, and which I firmly and emphatically attribute to the monotonous hours of confinement with their oft sepulchral quietness which have the tendencies to drive the victim of these conditions to the excessive use of liquors and drugs, the addition to either resulting in the loss of manhood and independence and the final subservieny to the unjust dictates of those out, and in, the vocation, who, by the strength of will power which nature, by reason of, and contact with, hours of freedom and opportunity, has given them, which they enjoy and selfishly deny others.

That the effect of this subservieny in any form is not alone limited to those engaged in pharmacy will be apparent, when we consider that when the offspring of pater familias require most essentially the parental incitation and guidance, it can not, under this antiquated system of the back woods be given and so the evil results also distribute themselves upon the heads of the innocent. The reflective of the opposition ought to feel humiliated when thinking, that they were endeavoring to perpetuate the system which produces these results.

I maintain that the enlightened laborer who has become cognizant of the causes of similar results and who has endeavored to obviate them by forming trade organizations to enforce the shorter work day, and the justice of which is recognized by our Government in inserting a clause to that effect in its contracts for public works, should be respected and not ridiculed and denounced, as has been the case by those who have been most aggressive in the endeavor to defeat the bill. Furthermore, the opponents decry the co-operation of these trade organizations with the statement that the vocation is brought down to the level of a brick-layer or a hod carrier and denounce any such affiliation as 'unprofessional.' Strange, the President of these States recognizes their worth, or should their denunciation be also ascribed to the above mentioned imagined 'superiority'? Better to have said these people have been able to maintain their rights, let us go to them and gain from their experience and possibly reach their elevation. As to non-association with them, that is a matter of choice, but to scoff at them means in a great many cases for the scoffer to scurrilize the source of his origin. Without being too personal, it is rumored that among the most active opponents are the son of a tailor, a butcher, a carpenter, a

sea captain and a New Jersey clam digger, and so on.

But I am inclined to be charitable, as observation proves that often the most severe denunciation comes from quarters where ignorance prevails in regard to the assailed matter.

In conclusion I wish to state that in every society there forms a stratum of ultra conservatism which tends to repress everything beneath and force down further difference of opinion. Every change or endeavor to improve a condition must force its way through this stratum, and if not by its own efforts, then by the help of others. Alleviate the condition of the helpless, those in the so-called lower strata and the upper strata will take good care to get a large proportion. On these lines I have been working and I trust that my friends who have referred to the endeavor and myself as impractical and visionary (as also stronger phrases), will give this matter a little more reflection, which they can do after the payment of the indebtedness incurred in the postponement, as it will be very difficult for them to raise similar ammunition for the renewed agitation. It would also be well to bear in mind that the realization of any desire, either simple or complicated, first is either worked out in theory or accidentally, but the question under consideration requires neither, it has passed that stage. In a future communication I will endeavor to show how the limitation of hours as proposed by the League will not be detrimental to any business, large or small, also how an advance of wages and employer's benefit will be proportionate. Respectfully, C. F. DOHERTY.

THE MANUFACTURE OF LIME JUICE.—When limes are freshly squeezed, the juice is always very turbid, owing to the presence of mucilage and extractive matter derived from the fleshy part of the fruit. This is what makes it necessary to clarify it. The same difficulty occurs in lemons, but the yield of juice from lemons is much greater than that from limes, indeed, the yield from limes is very small, and the freshly expressed juice always contains a large amount of pulp. This, however, on standing for a few weeks, separates out, and a clear, sherry-colored liquid (the true lime juice) is obtained, and can either be siphoned or decanted off. If time is no object, then the process of natural settling may be observed economically, but even then it is probable that upon storage the clear, sherry-colored liquid will get turbid, owing to the decomposition of mucilaginous matters which may still be in suspension. There are two courses open; either treat the juice in the manner which we are about to describe, or else allow it to stand for a few weeks, and then treat the clear liquid which is obtained, using the same process in this case also. This process is very simple, and simply amounts to heating the juice to a temperature not lower than 150° or higher than 160° F. If the temperature is carried above this point, alteration will take place, and a noticeable flavor will be communicated to the juice. While the juice is still hot, it should be filtered, and almost any filtering medium will do. On the whole, we recommend crushed quartz, graded and arranged in the filtering vessel in such a way that the larger pieces are at the bottom of the vessel, while the smallest fragments are at the top. If this process is performed shortly after the harvesting of the fruit, the juice will, under ordinary conditions, keep good for twelve months. But if the juice is intended for exportation, then it may be prevented from decomposition, and rendered fit for transit, by mixing it with one-tenth of proof spirit. This is Schweitzer's recommendation. If the flavor, however, is not objected to, there is a cheaper method of preserving the juice after it has been heated and filtered, and this simply consists in adding one per cent. of bisulphite of calcium. When ready for the market, the specific gravity should be 1.044, the percentage of citric acid should attain 8.66, and that of the ash obtained by evaporation and incineration, 0.101.—M. W. Trade Review.

CHLOROBROM. a solution of 6 parts each of chloral-mid and potassium bromide in 58 parts of water, is recommended as an excellent preventive of seasickness. On going on board ship a glass of soda water should first be taken and then a teaspoonful of the solution every half hour, until 3 doses are taken. (Sidd. Ap. Ztg.)

ARE WE BUILT UP LIKE CRYSTALS?

Those physicians and physiologists who are fond of making the most of every resemblance between physical and physiological processes are now calling attention to the likeness between the growth of the animal body (particularly the process of healing in a wound) and the increase of a crystal. In explanation of this resemblance, Natural Science says, (as quoted by Literary Digest):

"When a saturated solution of a crystalline substance is allowed to cool below the saturation point, the dissolved molecules dissolve their partnership with the fluid and slowly build up the structures we know as crystals. There are, however, a number of curious conditions of this process. In some cases, if the solution be kept absolutely still, no crystallization occurs, but a slight jar, or stirring with a wand, apparently miraculously transforms the liquid into a mass of crystals. In other cases, it is necessary, or at least advantageous, that some foreign granules of dust or threads of cotton be present, to serve as nuclei around which the forming crystals cluster, as the layers of nacre in a shell-fish transform an intruding grain of sand into a radiant pearl. But most curious of all are the cases in which an almost necessary stimulus is the presence of an already formed crystal of the crystalline salt. The analogy between this and the processes of life states at one. One fluid may contain all the ingredients for the building of crystals, but the crystals refuse to form until a formed crystal is dropped into them. Such comparisons have been made, and are worth making, if it be remembered that they are things of the dreamland, of the after-dinner meditative hours of science, rather than children of the working hours."

None the less, the author of the notes goes on to say, just such ideas have been suggested by the experiments by Prof. L. Ranvier on the healing of wounds, who, it will be remembered, observed the process of growth of one of the membranes of the eye, after it had been partially removed. To quote again from Natural Science:

"The construction begins around the edges of the undestroyed portions of the membrane, and creeps only slowly to the center of areas over which the old membrane has been entirely lost. He (Professor Ranvier) regards the process as showing that the edge of the undamaged membrane stimulates the adjacent endothelial cells to the formation of new membrane, as a formed crystal stimulates crystallization."

The similarity of such a regrowth to crystalline formation is certainly striking, but, after all, the objectors will probably say, it only carries into detail an already familiar analogy. Prof. Ranvier has thus made an addition to knowledge, but no new fundamental discovery.

DEPOSITS OF COBALT.—Cobalt is better than gold. A cobalt mine is more desirable than the richest golden bonanza of all the Rocky Mountains, and cobalt has been discovered at Grand Encampment, Wyo., by the French mineralogist, Charles Poulet. It is the first discovery of cobalt in America. Cobalt is worth \$1.60 a pound, and George Doane, the copper king of the Grand Encampment district, has a mine where thousands of tons of this ore are already in sight. Cobalt is the active principle that colors blue all porcelain and glass, and from it the world's great churches and cathedrals receive their delicate shading of blue in their arched windows and domes. It is the active principle of blue in oil and water painting. It is one of the rarest minerals. Norway, Sweden and Bohemia have in the past furnished the bulk of the world's supply. The Doane mine is a copper mine, and, in addition to its copper value, which is 70 per cent. pure, its ore yields \$128 to the ton in cobalt. This is only one among hundreds of copper mines at Grand Encampment, and if they all contain cobalt, Wyoming's new mining district within a year may be producing more wealth than any three mining districts in the world, not excepting Klondike, the Transvaal and Cripple Creek. Cripple Creek, Colorado's "golden wonder," last year added to the world's treasure of gold more than \$12,000,000. If cobalt exists in the Grand Encampment copper ore to the extent that M. Poulet asserts from his chemical analysis of the Doane ore, Grand Encampment will add to mineral wealth of the world \$100,000,000 annually, or else the price of cobalt will be reduced to a minimum.—Topeka State Journal.

REMOVAL OF PICRIC ACID SPOTS from the hands or linen is, according to Prieur, effected by rubbing them with a paste of lithium carbonate and water. (Ph. Rundsch.)

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Ellas H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblentz, A.M., Ph. M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Wilber G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Phm. B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Ph.D.	Henry H. Rusby, M. D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college, for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 27, 1898; the second term began February 17, 1898, and will end June 30, 1898. The junior class for 1897 is now closed.

FEES The entire expense is only \$7.75 per annum, and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 69.

Inorganic Chemistry.

The Chromium Family.—(Continued.)

MOLYBDENUM.

Symbol, Mo. Valence, 2, 4, 6, etc. Atomic Weight, 96. Specific Gravity, 8.6.

His'torial.—By ancient writers the Greek word "molybdos," and its Latin derivative, "molybdæna," were employed to designate a number of minerals containing lead, and at a later date came to be applied to almost any heavy, black mineral, as the native sulfid of antimony, the black oxid of manganese, graphite and the sulfid of molybdenum, etc.

This confusion continued until Scheele pointed out the difference between molybdenum sulfid and plumbago in papers published in the years 1778 and 1779. In 1781 Bergman suggested that the mineral contained a new metal, which fact was demonstrated by its extraction by Hjelrn in 1782.

Natural Occurrence.—The element occurs principally in the mineral "molybdenite," or molybdic sulfid, MoS₂; in "wulfenite," PbMoO₄, as the trioxid, or molybdic ochre, MoO₃, and in certain ores of iron.

Preparation.—Metallic molybdenum can be obtained in the free state by the reduction of its trioxid or trichlorid by heating in a current of hydrogen.

Description and Physical Properties.—Molybdenum is a silver-white metal, nearly infusible, harder than silver, and having a specific gravity of 8.6.

Chemical Properties.—The metal is permanent in air, but oxidizes when heated. It decomposes water at a red heat, is corroded by chlorin, and is dissolved and converted to molybdic anhydrid, MoO₃, by nitric acid, with evolution of nitric oxid, and by hot sulfuric acid with release of sulfur dioxide. It is unaffected by hydrochloric, hydrofluoric, or dilute sulfuric acids.

COMPOUNDS.

Oxygen Compounds.—Molybdenum forms four compounds with oxygen, molybdous oxid, molybdic oxid, a dioxide and a trioxid.

Molybdous oxid, or molybdenum monoxid, MoO, is prepared by the action of fixed alkalies upon molybdous salts, or by reduction of one of the higher oxids. It is a gray or black powder.

Molybdic oxid, or molybdenum sesquioxid, Mo₂O₃, is obtained by the reduction of one of the higher oxids, or

by ignition of molybdic hydroxid, Mo(OH)₃. It resembles the monoxid in appearance, and is insoluble in acids.

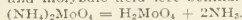
Molybdenum dioxide, MoO₂, is formed when the metal or the sesquioxid is heated in the presence of air, and when prepared in this manner appears in the form of a brassy, yellow powder. By fusing with zinc, and treating successively with caustic potash and hydrochloric acid, it is obtained in the form of dark blue prisms. It is insoluble in alkalies and acids, but by ignition or treatment with nitric acid is converted to the trioxid.

Molybdenum trioxid, or molybdic anhydrid, MoO₃, occurs naturally, as molybdic ochre. It can be prepared artificially by oxidation of the native sulfid, or of the other oxids. It forms a white powder, which becomes yellow on heating, and is soluble in acids and alkalies.

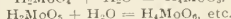
Molybdic Acid, H₂MoO₄. By heating the trioxid with caustic alkalies, molybdates are produced.



If the ammonium salt be gently heated, ammonia gas is given off, and molybdic acid left behind.



By combination with different amounts of water, other acids are formed.



Ammonium tetramolybdate, (NH₄)₄Mo₄O₁₆, is important as a reagent for phosphates, with which it produces a yellow precipitate of ammonium phosphomolybdate.

Sodium phosphomolybdate, in solution acidulated with nitric acid, is used as a test reagent for alkaloids, under the name of "Sonnenschein's reagent."

Halogen Compounds.—Molybdenum combines with chlorin in four proportions, forming the dichlorid, MoCl₂; trichlorid, MoCl₃, or (Mo₂Cl₆); tetrachlorid, MoCl₄, and the pentachlorid, MoCl₅. Similar compounds are formed with iodine and bromine. From a practical standpoint the halogen compounds are of but minor importance.

Sulfur Compounds.—Three sulfids are known, to which have been assigned the formulas, MoS₂, MoS₃, and MoS₄. The tetrasulfid is capable of acting as an acid anhydrid, as is shown by its forming a potassium compound having the formula K₂MoS₄.

A number of other compounds of molybdenum, some of them of quite complicated formulas, are known to

the chemist, but are not of sufficient practical importance to deserve the attention of the student.

Valency of Molybdenum.—Molybdenum exhibits some anomalous features of valency, as seen in the compounds considered. For example, the apparent valence of the element toward chlorine may be either two, three, four or five. In the trioxid the valence is six, and in the tetrasulfid, eight. It is possible that these different valencies may be due to our imperfect knowledge of the compounds, and that further research may simplify the present formulas.

Characteristic Reactions.—Molybdic acid and its salts, when acidulated with hydrochloric acid, and treated with metallic zinc, yield first a blue, then a green, and finally a brown solution. With hydrogen sulfid, the reddish-brown trisulfid is precipitated, soluble in ammonium sulfid. With phosphates, acidulated with nitric acid, yellow ammonium phospho-molybdate is precipitated. The trioxid colors the blow-pipe flame yellowish-green, and the borax bead green, when heated in the reducing flame.

TUNGSTEN (or WOLFRAMIUM).

Symbol, W. Valence, 2, 4, 6, etc. Atomic Weight, 184. Specific Gravity, 19.26.

Historical.—Until the middle of the last century the several minerals in which tungsten occurs were regarded as ores of tin. Scheele in 1781 proved the absence of tin, and a little later d'Elhuyar announced the presence of a new element, and succeeded in reducing it to the metallic state. The commonly accepted name, tungsten, is the same as that of the mineral in which it is found. It is of Swedish origin, from "tung," heavy, and "sten," a stone, literally "heavy stone." The alternative title is also derived from the name of another of its ores, "wolfram," from the German "wolf," and "ram," cream, literally "wolf-cream."

Natural Occurrence.—The ores of tungsten are not widely distributed, but occur in considerable quantities in some localities. The most important is wolfram, a tungstate of iron and manganese, calcium tungstate, wolfram ochre and wolframite.

Preparation.—The element can be obtained in the metallic condition by heating its trioxid with carbon, or in a current of hydrogen, or by reducing its chlorid with metallic sodium.

Description and Physical Properties.—As obtained by the processes previously named, tungsten occurs in the form of a light gray powder, with a metallic luster. It is fusible only at a high temperature, and has a specific gravity of 19.26, or is practically as heavy as gold.

Chemical Properties.—The metal is permanent in the atmosphere, but at a red heat burns to form the trioxid. It combines with chlorine and bromine, and less actively with iodine. It is dissolved by a boiling solution of fixed alkalis, and slowly attacked by nitric acid.

COMPOUNDS.

Oxygen Compounds.—Three oxids of tungsten are known, a dioxid, WO_2 ; trioxid, WO_3 , and one having the composition, W_2O_5 . The last is probably a combination of the first two.



The trioxid may be regarded as the anhydrid of tungstic acid, H_2WO_4 , which corresponds in formula to chromic, sulfuric, and the other acids formed from the trioxids of this group. The salts of this acid, the tungstates, resemble the corresponding compounds of molybdenum. Some of very complex composition are known.

Hydrogen Compounds.—Four chlorids of tungsten have been prepared, the dichlorid, WCl_2 ; tetrachlorid, WCl_4 ; pentachlorid, WCl_5 , and hexachlorid, WCl_6 . With bromine it forms a dibromid, WBr_2 , and a penta-bromid, WBr_5 . A di-iodid, WI_2 , is also known.

Numerous other compounds of tungsten have been studied, but are not of sufficient practical importance to warrant their consideration. None of them possesses a very extended usefulness. A colloidal form of tungstic acid is soluble in water to form a thick, gum-like solu-

tion, which has been used as a substitute for mucilage. Another compound known as sodium paratungstate, $Na_{12}W_{12}O_{40}$, is sometimes used as a mordant in the dyeing of cotton, and as an application to render hangings, clothing and similar articles unflammable.

URANIUM.

Symbol, U. Valence, 4, 6, etc. Atomic Weight, 240. Specific Gravity, 19.33.

Historical.—Uranium was discovered by Klaproth in 1789, but was not obtained in the metallic state until 1942, when it was extracted by Pellot. Its name was given it by Klaproth, in honor of the planet Uranus, then lately discovered.

Natural Occurrence.—Uranium occurs mainly in pitch blende, a heavy brown or black mineral, which consists mainly of uranous-uranic acid, U_3O_8 . It is also found in uranite, leibigite and samarskite.

Preparation.—The element can be obtained in the free state by the reduction of its chlorid by metallic sodium.

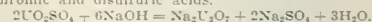
Description and Physical Properties.—Uranium is a bluish-white metal, resembling nickel in appearance. It is hard and malleable, and has a specific gravity of 19.33. It is nearly infusible.

Chemical Properties.—It is permanent in air, but takes fire when heated in the powdered form. It combines with chlorine, and with sulfur when heated with the latter, and dissolves in dilute acids, with evolution of hydrogen. Uranium and its oxids are, as a rule, more basic than tungsten.

COMPOUNDS.

Oxygen Compounds.—The oxids of uranium, as far as studied, correspond in composition to those of tungsten, consisting of a dioxid, UO_2 ; a trioxid, UO_3 , and a uranous-uranic acid, U_3O_8 , which is a combination of both the others.

The dioxid acts as a quadrivalent base in the uranous salts, as uranous sulfate, $U(SO_4)_3$. The trioxid is the anhydrid of uranic acid, H_2UO_4 . The most important compounds of uranium are the uranyl salts, in which the radical uranyl, UO_2 , derived by reduction of the trioxid, takes the place of a bivalent base, as in uranyl nitrate, $UO_2(NO_3)_2$, uranyl sulfate, UO_2SO_4 , etc. When a uranyl salt is treated with a hydroxid, a salt of duranic acid, $H_2U_2O_7$, is formed, corresponding to dichromic and disulfuric acids.



The sodium duranate of the preceding equation constitutes the so-called uranium yellow, employed in coloring glass, to which it gives a yellowish color, with greenish fluorescence.

Halogen Compounds.—The principal halogen compounds are the trichlorid, UCl_3 ; tetrachlorid, UCl_4 , and pentachlorid, UCl_5 . They are of scientific importance only.

STAMPING PLAYING CARDS.—The Commissioner of Internal Revenue recently issued an order amending the former ruling of his department as to the manner of casing and stamping playing cards, which may be offered for sale enclosed in leather, plush, celluloid or metal cases. The cards, when offered for sale, must be packed by placing an extra blank card, to prevent spoiling one of the fifty-three cards in a pack, on the back or stamp side of the pack, and wrapped by extending a paper band not less than one-half inch wide around the entire pack of cards, both the short and long way, and securely fastening such bands at the intersection of the stamp side with paste or mucilage, so that the cards cannot be opened or removed from the pack without breaking the bands. The internal revenue stamp should be affixed by attaching it securely to the back of the pack of cards, in such a manner that it shall adhere partly to one of the paper bands and partly to the back of the blank card, so that the removal of the band from the blank card will tear and destroy the stamp. The stamps are to be effectually canceled as provided by law.

HÆMOFERRUGEN is a new name for hæmatogen.

LECTURE No. 70.

Pharmaceutical Processes.

THE REQUISITES OF A GOOD BALANCE.

The delicacy of a balance depends both upon the character of the material and the degree of care and skill employed in its construction.

In ordinary instruments the knife edges are of hardened steel, standing upon planes of the same material. In the Chemical Balance, as the balance used in analytical work is called, and in the finer grade of prescription balances, the knife edges and planes are composed of polished agate, a material harder than steel, incorrodible by chemical substances, and susceptible of a very high degree of polish. Notwithstanding their greater first cost, such instruments are cheaper in the end, because of the indestructibility of the parts exposed to most wear.

Among the points which go to make up perfection in a fine equal arm balance are the following:

(1). The terminal knife edges or the points of support of the pans should be equally distant from the central knife edge or fulcrum. If the terminal supports are not equally distant from the central support, the instrument is not an equal arm balance.

(2). If the instrument is a knife edge balance, the knife edges must all be parallel and sharp. If the knife edges are not sharp, when the beam is inclined one arm is made shorter than the other by an amount equal to the sum of the thicknesses of two knife edges, and the instrument becomes an unequal arm balance. The arms are also made unequal when inclined, if the knife edges are not strictly parallel to each other.

(3). The center of gravity of the beam with the pans attached should be *below* the point of support, but as near to it as possible without coincidence. If the center of gravity coincides with the fulcrum, then the system is like a wheel supported exactly at its center of weight, and tends to remain in whatever position it is placed. In other words, the system would be in a state of neutral equilibrium. If the center of gravity is *above* the center of support, then the condition is that of unstable equilibrium, and liable to upset. On the other hand, if the center of gravity be too far below the fulcrum, the system is in stable equilibrium and lacks delicacy.

(4). The points of support of the pan stirrups and the fulcrum should lie in the same plane. If the end supports are *above* the plane of the fulcrum, then the addition of a load to the pans tends to raise the center of gravity above the fulcrum and to cause the condition of unstable equilibrium above referred to, and to cause the beam to overset. If the plane of the terminal supports is *below* the plane of the fulcrum, the addition of a load causes a lowering of the center of gravity and a consequent decrease of sensibility. If, on the contrary, the planes are all in the same horizontal plane, the addition of a load to the pans causes the center of gravity to continually approach to the point of support, a condition which favors delicacy. Theoretically, the delicacy of such a balance should be increased by increasing the load. Practically, however, this is not true, owing to the rapid increase of the friction between the knife edges and the planes.

(5). The beam should be rigid. If it bends under the load, the plane of the terminal supports is brought below the plane of the fulcrum, causing a loss of sensibility by a lowering of the center of gravity, as described in the preceding paragraph.

CARE AND USE OF THE BALANCE.

A fine balance is a delicate piece of apparatus, and must be used and cared for accordingly.

It should be placed so as to be as free as possible from vibration, caused by walking over the floor, pounding, etc. It is preferably placed on a shelf which is attached to the wall, and which is not used for any other purposes.

It should not be placed in a position where it will be exposed to sudden or extreme changes of temperature, and should therefore not be situated near to a heater,

or where it will receive the direct rays of the sun.

When not in use the knife edges should be lifted from their bearings, in case the balance is provided with a mechanism for that purpose.

Nothing should be placed on a pan or removed from it while the knife edges are swinging free on their bearings.

No object, however small, should ever be permitted to drop into a pan. A single neglect of this and the preceding precaution may permanently impair the delicacy of a fine instrument.

Oils should never be used on any of the working parts of a balance.

The substance to be weighed should not be placed directly in the pans, but is preferably weighed in the vessel, such as crucible or evaporating dish, in which it is to be used.

Volatile corrosive substances, such as iodine, nitric acid, etc., should always be weighed in closed tubes or bottles, and the balance case thoroughly aired after the operation, to remove any traces of corrosive vapors.

It is a good plan to keep a small beaker of lime or caustic soda in the case, to absorb aqueous or acid vapors. (A vessel of sulfuric acid will absorb moisture, but will not remove acid or corrosive vapors).

Weights which have been adjusted for analytical purposes should be handled only by means of the pincettes, which are provided for that purpose. If handled by the fingers, sufficient moisture will be imparted to them to induce corrosion and affect their weight.

Substances should not be weighed while hot, as the currents of air set up inside the case will render the results inexact.

Hygroscopic substances, as calcium chloride, sulfuric acid, etc., should be weighed only in closed vessels, to prevent their increase in weight through absorption of moisture. Two watch crystals, with their hollow sides together, answer for small bodies. The small, wide mouthed bottles of thin glass, known as weighing flasks, are also quite convenient for this purpose.

In weighing in air it should be remembered that it is not the true weight of the substance which is obtained, but this weight less the weight of an equal bulk of air. This is owing to the principle that bodies immersed in a fluid are buoyed up by an amount equal to the weight of the fluid displaced. At common temperature and pressure, a brass pound weight displaces 1.047 grains, an iron pound weight 1.196 grains and a pound of water 8.522 grains of air. For ordinary purposes these slight variations from the true weight may safely be disregarded, but in cases where extreme exactness is required, as in the determination of atomic weights, the operation must either be conducted in a vacuum, or the weights found in air must be corrected for the disturbing influence of the latter.

MANNER OF PERFORMING THE OPERATION OF WEIGHING.

There are three methods of conducting the operation of weighing which are worthy of notice. These are as follows: Direct Weighing, Weighing by Reversal and Weighing by Substitution.

Direct Weighing.—This is the common method. The substance to be weighed is placed in one pan and weights added to the other until equilibrium is restored. With unequal arm and with spring balances, direct weighing is, of course, the only method possible. In direct weighing with an equal arm balance, it is a good practice to always place the substance being weighed in the same pan, preferably the left.

It frequently occurs that, owing to inequality in the length of the arms of the balance or to some other defect in workmanship, a substance weighed in one pan of the balance and then transferred to the other pan will be found to indicate a different weight. In such cases, to find the true weight, it will be necessary to make use of one of the next two methods of weighing.

Weighing by Reversal.—By this method it is sought to counteract the error caused by one of the arms being longer than the other. The object is first weighed by

the direct method, and the result noted. The substance to be weighed and the weights are then exchanged in the pans and the new result taken. For the greatest accuracy, the two weights are multiplied together and the square root of the product extracted. The geometric mean thus obtained is the true weight. For ordinary purposes the arithmetic mean is sufficient, obtained by taking one-half of the sum of the two observed weights.

Weighing by Substitution.—By this method the substance to be weighed is placed in the pan and accurately balanced by means of some heavy material, as sand or small shot, which is poured into the opposite pan. The substance being weighed is then removed and weights added in its place until the shot or other material in the other pan is again balanced. It is evident that the weights which must be added to restore the equilibrium represent the weight of the substance removed, or the true weight sought.

CHOICE OF BALANCES.

Balances should always be selected with reference to the kind of work which they are expected to perform. For prescription work it is well to have two balances, one of quick action and moderate sensibility, for the weighing of drugs commonly used in prescriptions, and one of finer construction, turning with the hundredth of a grain, to be used for weighing the more potent physiological agents, as the poisonous alkaloids, and to be used as an analytical balance in making the various quantitative determinations required by the Pharmacopœia.

For the common business of the store the pharmacist has a wide range of styles to select from. It will be convenient to have on the counter, used for general dispensing of goods to the public, a balance capable of weighing quantities of several pounds down to the fraction of an ounce with comparative accuracy. Some

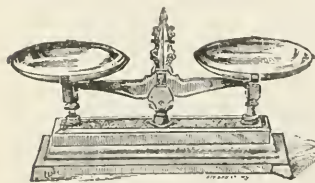


Fig. 5.—Trip, or Roberval Scale.

form of the popular box scale is generally selected for this purpose. For the weighing of coarse and bulky drugs, such as copers, the earth paints,

etc., the cheaper forms of equal arm balances, commonly known as "trip scales," or the style known as the "grocer's scale," with unequal arms and a scoop-shaped pan, serve excellently.

All counter scales should have the pans supported above the beam. When hung below, the pan supports frequently interfere with the use of paper on the pans, or with the weighing of broad and shallow vessels.

Pans and scoops are made of tinned iron, brass, or of brass plated with nickel. The latter are to be preferred to the former, though pans of solid nickel are still better if they can be afforded. Articles to be weighed should not be placed directly in the pans, but on a piece of paper counter-balanced by a similar piece of paper in the opposite pan. Prescription and analytical balances should always be provided with a pair of counter-poised watch glasses, to be used instead of papers.

Weights.—Weights are standard masses of metal or other material, used with beam or lever balances to produce equilibrium, the standard mass being placed at one end of the beam, and the object to be weighed at the other. Strictly speaking, the standard weights are a part of the balance, since they are indispensable to the use of the latter.

The material of which weights may be constructed should be sufficiently resistant to abrasion and corrosion to prevent their alteration through wear. For weights of the higher denominations the material should have a high specific gravity, as iron, brass, etc., so that the weights may not be inconveniently large, while for the lower denominations, as grains, milligrams, etc., the material should be of low specific gravity, as aluminum, so that the weights should not be inconveniently small.

When composed of corrodible materials, as brass or

iron, the weights should be covered with lacquer to protect their surfaces. Whether lacquered or not, they should be cleaned with a soft cloth, without scouring. When wet with liquid, or with deliquescent salts, they should be wiped off immediately.

The forms given to weights are various. Avoidrups weights, of brass and iron, from an ounce to several pounds, are usually flat and circular, with the upper surface of each one slightly dishd to receive the under side of the next lower denomination, so that the weights make a conical stack when piled up. The objection to this form is that it is necessary to remove the upper weights of the stack every time one of the lower ones is required for use.



Fig. 6.—Stack of Weights.

Another popular form is that of a cylinder, with a small knob turned at the top by means of which the weights may be lifted. Weights of this pattern are usually accompanied by a block or iron frame containing cavities, in which the weights severally fit, and therefore commonly known as "block weights."



Fig. 7.—Block Weights.

Weights of two drams down to one scruple are usually shaped like thick coins, with their values embossed upon the surface. Sometimes they are square, with their denominations engraved or pressed in. Weights of fifty

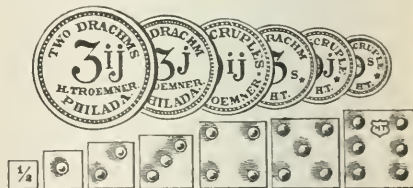


Fig. 8.—Apothecaries' Prescription Weights.

grams to one gram are usually circular, with a knob, by means of which they may be handled. Weights ranging from one scruple or half a gram down to the grain and milligram are usually thin pieces of metal stamped with their appropriate denominations. For weights of 1.5 character, brass, though commonly used, is very unsuitable, owing to the certainty of corrosion, which not only obscures the marks upon the surface, but materially adds to the weight. Platinum and aluminum are much better.

A very serviceable kind of weights for prescription purposes are the aluminum wire weights, in which the denomination is indicated by the number of sides, a grain weight being simply a straight piece of wire, a two grain weight a piece having two sides, a three grain weight having three sides, etc.

Weights intended for analytical purposes and the better class of prescription weights, are always put up in a neat wooden case, and provided with pincettes, which should always be used in handling them.

Troy weights are usually in cup form, manufactured in cup form, pincettes.



Fig. 11.—Troy Cup Weights.

each denomination being held in the cup of the next larger denomination. This is a very inconvenient form, and is useful only to call attention to the fact that the weights are not avoidrups.

VESSELS USED IN MEASURING LIQUIDS AND GASES.

The material of which the measuring vessels of the apothecary are composed may be made of glass, metal or earthen-



Fig. 10.—Weights in Case, with Pincettes.

ware. Lately, also, there have come into limited use measures made from chemically prepared wood fiber, which has been moulded into the required form while in a paste-like condition, and treated so as to render it waterproof.

The graduation or standardization of measuring vessels may be either in the metric, or according to the Apothecaries' or Wine Measure. With the official recognition which the Pharmacopoeia has accorded to the Metric system of weights and measures, it may be expected that the old systems will gradually become less used, and, it is hoped, eventually obsolete, but it is probable that for many years yet prescriptions will continue to be written and compounded in terms of apothecaries' weight and measure.

For the measurement of considerable quantities of liquids, or where very great accuracy is not required, the measures are usually constructed of metal or porcelain. Such vessels are commonly made in the form of a truncated cone, resting on the base, and provided with a lip and handle. The wide bottom gives to the vessel the required steadiness, while the narrow top decreases the amount of error of observation when the vessel is not held perfectly level. The sizes commonly range from one-half pint to one or two gallons.

The metals used in such vessels are tinned iron, tinned copper, block tin, and the so-called "agate ware," which consists of sheet iron covered with a porcelain-like glaze. Each material has its advantages and its defects. The measures made from tinned iron are light and cheap, but when the tin is worn off, quickly rust out, and what is worse, are liable to contaminate with iron the liquids for which they are used. Those made from tinned copper are lasting, but are easily dented, and the accuracy of the measure impaired, or, when the tinned surface is worn through, are especially liable to corrosion and consequent contamination of measured liquids with copper. Vessels of block tin are expensive and easily dented, but are lasting, and comparatively incorrodible by ordinary liquids. Measures made of agate ware, or of iron covered with porcelain, if improperly made or used, are liable to scale off and expose the metal, which then quickly rusts out.

The best way in which to avoid unpleasant results from incorrect or corroded measures is to have a set of measures specially appropriated to each class of liquids. Thus, one who had a set of measures of tinned iron for the measuring of the paint oils, turpentine, burning oils, etc., when such liquids are handled, a set of agate or fiber-ware vessels for the measuring of syrups and non-corrosive aqueous liquids generally, and a set of vessels of tinned copper for the measuring of spirituous liquids, would be safe from the losses and annoyances so frequently arising where one set of measures is made to serve for a number of liquids of totally dissimilar properties.

Measures of Glass.—The measure most used in dispensing pharmacy is the well-known "graduate," made from glass, which material, because of its non-corrodibility by all ordinary liquids, its transparency, admitting of accurate measurement by looking directly across the surface of the liquid which it contains, and the readiness with which such vessels may be cleaned, is pre-eminently fitted for the purposes of the apothecary.

Graduates are made in two general styles, the obconical and the cylindrical. The obconical is the form most familiar to the public and has been the longest in use, and is popularly regarded as one of the peculiar insignia of pharmacy. It is in the form of an inverted cone, whose apex is fused to a broad, flat base, upon which the vessel rests. The cylindrical is a style of later introduction, and is in the form in which metric measures, especially those used by chemists, are

commonly made. Of whatever shape, the base or foot should always be of sufficient width and weight to prevent the vessel's being too easily overturned.

The chief advantages of the inverted cone shape are the readiness with which the hand or fingers may be inserted for cleaning, and the greater accuracy which is secured in the measurement of small quantities of liquid, which, being measured near the bottom, where the vessel is narrowest, reduces the error of observation to a minimum. The chief disadvantage of the shape lies in the fact that when the vessel is filled near to the top, a considerable error may be caused

Fig. 13.—Cylindrical Graduate.

by holding it at a slight inclination from the perpendicular. This may be obviated by having the lines to run clear around the vessel, or by having duplicate lines engraved on the opposite side. A convenient style of graduate is one having one side engraved with apothecaries' and the other with metric units. The same vessel may thus be used for either system.

Two methods of graduation are employed by manufacturers of graduates. Some are graduated to contain the quantity stated, while others are made to deliver the quantity indicated by the graduation. The latter kind is to be preferred, as some of the liquid will inevitably adhere to the sides of the measure, the amount, of course, varying with the viscosity and adhesiveness of the liquid measured.

Of measures graduated according to the Apothecaries' system, the smallest size in common use is the fluidrachm, graduated in minims. The largest size commonly used is the pint, marked near the bottom in fluidrachms, and near the top in ounces and half ounces. Other convenient sizes are one, two, four and eight ounces. Of metric measures, the most convenient sizes are the Liter, half liter, quarter liter, tenth liter and ten cubic centimeters. Minims and fractions of the cubic centimeter are very conveniently measured by means of graduated pipettes.

A well regulated and equipped pharmacy should have a number of the different styles, at least two of each size, of graduated measures, and each should be carefully tested as to its accuracy, and its error, if any, recorded or marked on the graduate. This may be easily accomplished by first standardizing one of the graduates carefully by weighing the amount of distilled water which it delivers, and then comparing the remaining graduates with this one. Imported graduates are sometimes found to be graduated in the Imperial system, which, of course, renders them nearly useless in America.

It goes without saying that the measures of the pharmacist should be kept scrupulously clean, which means that they are not to contain any substance, however small the quantity, except the liquid which is being measured. Every vessel should be cleaned as soon as it is through with. The habit which obtains among some country druggists of repeatedly using the same measure without cleansing until it receives a grimy coating of a multitude of different substances is indescribably filthy, and better befits a savage than one who aspires to be considered a member of an honorable profession.

Water-soluble substances may be removed by simple washing in clean water, followed by ample rinsing, and wiping with a clean and soft cloth. Resinous or tarry substances and volatile oils may be best removed by the use of some solvent, as benzine, turpentine or alcohol, followed by washing in water. Sometimes a solution of an alkaline substance, as caustic soda or sodium carbonate, will form easily soluble compounds with the material. One of the best methods of removing fixed and greasy oils or other liquids not soluble in water, is by the use of clean, dry sawdust. A box of this substance is kept handy, and the graduate thoroughly rubbed inside and out with the absorbent wood dust. The grease is quickly taken up by the sawdust, and a final wiping with a soft, dry cloth leaves the vessel clean and bright.

Metric Measures Used in Testing.—For the purpose of performing the various processes of assay required by the Pharmacopoeia, measuring vessels of special form are



Fig. 12.—Conical Graduate.

generally necessary. The most common of these are Pipettes, Burettes, Graduated Cylinders and Graduated Flasks. They are generally graduated with greater accuracy than the vessels employed in ordinary dispensing and have a narrow or contracted form, especially at the reading point, so as to reduce the errors of observation to as small a margin as possible.

The Pipette.—This is in the form of a slender tube, and is filled by suction, the moistened finger quickly pressed over the upper orifice, when the column of liquid is held up by atmospheric pressure. By raising the finger slowly, the liquid is permitted to escape rapidly or in drops, at will. The pipette may be of the same diameter throughout, and graduated in cubic centimeters and fractions, or in fluidrachms and minims. When enlarged by a bulb in one portion, and made to deliver a given quantity when filled to a mark on the stem, it is known as a volume pipette. Some pipettes are provided with a rubber bulb or nipple at the top, by means of which the tube is filled and emptied.

The Burette.—This is the instrument most frequently used in volumetric testing, and is made in several forms. Mohr's burette is a long, slender tube, open at the top, of equal diameter until below the graduations, and tapering to a small point at the bottom. The instrument is held upright by a

suitable clamp. The usual capacities are from 25 to 50 cubic centimeters, and the graduation is from the top downward, and in cubic centimeters and tenths.

For liquids which do not attack organic matter, the taper end may be connected by a rubber tube with a small piece of glass tube. Over the rubber tube is passed a pinch cock of brass wire, which closes automatically. For corrosive liquids, the lower end of the burette is fused to a portion

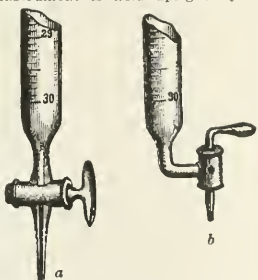


Fig. 15.—Glass Stop-Cock Burettes.

having a glass tap ground in.

Another form is Gay Lussac's Burette, consisting of a tall and narrow graduated cylinder standing on a base, and having a slender delivery tube running up the side. The contents are forced out by blowing through the tube at the top.

Before using, burettes should be rinsed out with a portion of the liquid which is to be measured. Glass taps should be loosened and oiled before putting away, or they may become fastened and useless. This is especially liable to result if the instrument has been used to contain an alkaline liquid.

Graduated Cylinders.—These are tall, narrow, cylindrical vessels, provided with a flat, heavy base. Some are provided with a ground glass stopper, which permits their being shaken, and are known as mixing cylinders. The common sizes range from 100 Cc to 1,000 Cc. The larger are graduated in 5 Cc's, and the smaller in centimeters and tenths. Their small diameter permits accurate measurements to be made, and this is further assisted by having some of the marks run clear round the cylinder.

Graduated Flasks.—These are flasks of thin glass, with flat bottoms and narrow necks. They may or may not be stoppered, and are made to contain a certain quantity when filled to a mark on the neck. They are of especial use in making up volumetric solutions. The sizes com-

monly used are 25, 50, 100, 250., 500 and 1,000 cubic centimeters.

Domestic Measures.—Beside the standards of the legal and official systems of measures, some others are commonly made use of in the dosing and administration of medicines. A list of the more common standards of this character is given below:

DOMESTIC MEASURES AND THEIR EQUIVALENTS.

The Drop, about one minim.

The Teaspoonful, about one fluidrachm.

The Dessertspoonful, about two fluidrachms.

The Tablespoonful, about four fluidrachms.

The Wineglassful, about two fluid ounces.

The Teacupful, about four fluid ounces.

The equivalents given above are very indefinite, since the capacity of the several vessels mentioned varies with the caprice of fashion or the fancy of the maker.

Popularly a drop is considered to be the equivalent of a minim. While this is approximately true in some cases, it is quite wide of the mark in others. The size of a drop varies with the viscosity and adhesiveness of the liquid, the shape and material of the vessel from which it is dropped, and the rapidity with which the operation is conducted. Some very viscid liquids, like syrup of acacia, may not yield more than 30 drops to a fluidrachm, while very mobile liquids, like bromin and chloroform, may yield as many as 250 drops from the same quantity. Consequently, when minims are prescribed, the pharmacist should dispense minims, and not drops.

Of late years it has become common in some places and the habit should be encouraged, of using medicine glasses for the administration of medicines. These are small, tumbler-like glasses of about a fluid ounce in capacity, and marked in teaspoonfuls, tablespoonfuls, etc., but graduated in fluidrachms. They can be furnished with prescriptions at a small price, or may bear the name of the pharmacist, and be presented by him to his patrons as an advertisement.

GUAIACYL.—This new preparation, which has given good results as a local anesthetic in minor surgery and dentistry, is made in the following manner: 100 Gm. of pure gualacol are fused at a low heat in a flask and 100 Gm. of pure concentrated sulphuric acid gradually added in such a manner that no sudden rise of temperature takes place. After standing 48 hours at ordinary temperature the contents of the flask have assumed a red color and the consistence of a thick syrup. This is diluted with 6 to 7 times its weight of distilled water, heated to 80° C. on a waterbath, saturated with calcium carbonate, which is gradually added in small portions, then filtered and evaporated to dryness. The residue is dissolved in 4 to 5 times its weight of absolute alcohol, the solution filtered, again evaporated to dryness and powdered. The product is the calcium salt of gualacol-sulphonic acid, or guaiacetyl. It is a gray-blue powder, easily soluble in water and alcohol, and insoluble in oils. (Ap. Ztg.)

CESEYUS.—In place of the expensive lanolin the Wr. Med. Bl. recommends a cheap, impure woolfat bearing the above name, which is a by-product in cleansing sheep-wool, and is obtained in form of a tenacious, unctuous mass of dark brown color and a disagreeable odor. The odor can be masked by addition of vanilla, but it is advised not to use this fat in acute eczema. The following formulas are given: (1) Zinc oxide, starch, of each 20 parts, olive oil, cesypus, of each 30 parts, vanilla 0.2 parts. (2) Zinc oxide, starch, of each 20 parts, olive oil, cesypus, of each 28.5 parts, tincture of benzoin 3 parts. (Ph. Post.)

OIL OF CYPRESS is recommended as the best remedy for whooping cough. It is employed by putting a few drops on the pillow of the patient and also by distributing the oil in form of vapor through the atmosphere of the sickroom by means of an atomizer. The patient is improved in a few days and the malady takes its course rapidly and in mild form. (Ph. Post.)

Fig. 14.—Volume Pipette.



Fig. 16.—Pinch-Cock Burette.

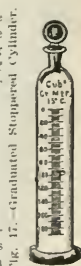


Fig. 17.—Graduated Stoppered Cylinder.

(Special Correspondence.)

THE INTERNATIONAL HYGIENE CONGRESS AT MADRID.

Dr. Rufus Tryon, ex-surgeon-general of the United States Navy, and Surgeon Major General Girard, of the American Army, have just returned from Madrid. The Era man met Dr. Tryon in Paris, where he is looking up the latest things in army and naval sanitation, etc., on behalf of the United States Government.

"I came up from Madrid two or three days before General Woodford left," he said. "I saw the Spaniards' patriotic demonstration from the window of my hotel in the Puerta del Sol; but I must say, we were very well received."

The Congress was a great success, of the 2,000 members about 800 were foreigners, the French element predominating. Among the Spanish organizers were several leaders of pharmacy in Madrid,—Professors Macho Velado, de la Puerta, Gomez Pamo, Rodriguez Carracido, and Olmedilla Puig of the Faculty of Pharmacy, Senor Camo, the pharmacist-deputy at the Cortes, Senor Garrido Mena, Delgado Llorente, Louis Siboni, etc., etc.

"We held our meetings at the National Library, a fine new building not far from the Prado," continued Dr. Tryon. "Mr. Girard spoke at the opening meeting, and expressed in a few words his hope that all political differences would be smoothed over ere the Congress closed. He and I were the only United States delegates, and our being in uniform made our position delicate. I sat, of course, in the section of Naval and Military Hygiene, and read a paper on the United States Naval Museum of Hygiene at Washington (D. C.), accompanied by photographs and a complete catalogue, which I offered to the President of the Section. This seemed to interest my audience, for such an institution does not exist elsewhere, to the best of my knowledge. The Spaniards have certainly made great progress in hygiene since I was at

that to spread sewage on land is best, whenever practicable. No chemical process, several speakers maintained, had yet been produced which was really perfect. In many large German towns, thorough sewage treatment had practically stamped out typhoid.

The Section of Bacteriology

was, as usual, the most interesting, and here as elsewhere, the French delegates were very much to the fore.

M. Nocard announced that, collaborating with Dr. Roux, he had identified the microbe of peripneumonia (cattle disease). The "culture" was obtained in envelopes of collodion which were subsequently introduced into the peritoneum of animals. This microbe "holds the record" as the smallest yet known; it is a mere speck even under the most powerful microscope.

Dr. Borrel, another of Dr. Roux's fellow-workers, said that tetanus in rabbits, though proof against subcutane-



Museum and Church of St. Geronimo.

ous injection of antitoxin, could be cured, after some hours, by inoculating the brain. The experiment is to be repeated on larger animals with a view to test its adaptability to the human being.

Dr. Calmette of the Lille Pasteur Institute, doubts the real efficacy of cholesterine, tyrosine, bile, etc., against snake-bites, and illustrated (by actual experiments on rabbits, etc.), the results of his anti-venomous serum.

Mr. Durham of Cambridge (England), read a paper on the "Micrococcus of Mediterranean Fever."

Dr. Chantemesse (of Paris) gave some notes on his researches on anti-toxic serum of typhoid fever.

Behring on Tuberculosis.

Dr. Behring, the well known German bacteriologist, was present, and mentioned that his new anti-tuberculous serum, obtained from birds, was superior to that hitherto produced from horses and cattle; and would, he hoped, lead to a satisfactory result.

He is already able to cure tuberculosis in cattle by tuberculin (the toxine of tuberculosis) but this system is inapplicable to human beings, as although nine-tenths of the beasts are cured, the rest die under treatment.

To Sanitary Engineers

and architects, etc., Dr. Vallin's paper on the treatment of walls was very original and interesting. He attributes the evil effect of damp walls to the bacillus of nitrification. When building, walls and foundations should be isolated from earth by coal-tar, cement, or some such material, and the mortar mixed with sulphate of copper or similar antiseptic substances.

To Cure Damp Walls

already existing, all exterior traces of saltpetre should be scraped away, the walls inoculated with nitrifying bacilli, and coated with impermeable paint.

Paris in 1900

was named as the date and place of the Tenth Congress of Hygiene.

SALOSANTAL is a mixture of salol and oil of sandalwood. It is recommended by Dr. Weber (Med. Wochensh) in pathological conditions of the urinary organs, taken preferably in gelatine capsules.



The Royal Palace, Madrid.

Madrid 15 years ago. The new Military Hospital, just outside Madrid, is a model in its way, 300 or 400 beds out of the 700 are already occupied. The building (not yet complete) is on the latest antiseptic principles, and has an ample water supply, electric light, etc., etc."

"Were you received by the Queen?"

"Yes, all the Congressists were invited to the Royal Palace on Wednesday afternoon, April 13. We were shown into a handsome suite of reception rooms, and the Queen Regent and little king entered, followed by a guard of honor, and spoke to most of the official foreign delegates, myself included. Queen Christina is an excellent linguist and addressed me in English, but we subsequently drifted into French. She has a charming manner, and was evidently anxious to show that no ill feeling existed. The king, a delicate child, did not join in the conversation. After the reception we were offered light refreshments, and had a very pleasant afternoon altogether. In fact, to judge by the way the Congressists were received and entertained everywhere, no one could have believed any political crisis existed."

The Disposal of Sewage

was discussed at some length by the French, German, Belgian, English and Spanish delegates. It was decided

SOME THOUGHTS, SUGGESTIONS AND ADVICE.

BY JOSEPH F. HOSTELLEY.

ARE YOU A MEMBER OF "THE BROTHERLY ORDER OF MOSSBACKS?"

Do you wear the badge of fogey and hearken to the counsel of the plenipotentiary of the mossbacks? There's a last roll call being made, better hasten to the fore. Meetings have been but meagerly attended lately, resolutions have been made for naught, treasury is depleted, disorganization is the talk. Your grips and passwords are known to all, your inherent interests have been denuded, your every move is being defeated. Other antagonistic orders are more influential and better organized. They can offer their members more substantial benefits and guide their interests with a rein more taut and true. Better settle up your obligations and join another lodge, an up-to-date association.

Did you say you had no cognizance of this society or its aim? Why, friend, I see the insignia of the order about your store! Look at the furniture, ancient and time-worn. See the stock displayed about, meager, to say the least, and lacking, too, in present style; enough of one commodity, but not enough variety, and what you have seems not the least bit modern. Why do you press forward the demands of by-gone times and shield from view what you must keep to accord with present modes? Look at the yellow, pink, and drab-hued patents prominently displayed behind doors of glass, on case and counter. This is not true to the teachings of the hour. Your floor of boards is marked and marred with the aging traces of the passage of many feet. The steps before your door are stained fast-brown through ill-attention inconsistent with the cleanly methods of to-day. Your windows and their fittings reflect a drug-pounding, plaster-spreading period. Your soda fountain is uninviting, small and antique. Your glasses are heavy and holders few. The appliances appurtenant to prescription work are not of the kind and number conducive to complete or commodious results. In pharmacy times of old this stock and store might have well been praised, but, like the science of compounding drugs, the apothecary shop of two score years back has by gradual evolution assumed a different phase and form. You and yours have changed but little; you are a mossback or one of his kin.

Come, friend, brush away the memory of those dusty, cob-webbed preachings of that society so soon to be extinct. Forget the ways of men who raise objections to every onward move. Emulate not the methods of the proverbial man who harps that lay "I can remember!" Disassociate your interest from the fogey of that decayed clan. Alter your deportment. Change the aspect of your possessions and your work. Seek companionship with wide-awake, progressive men of the period. Admit yourself to the ranks of a modern union.

Did you ask the dues demanded by these orders we suggest? Well, to you they may seem great: The debt you would owe for membership to some within this class would be progressiveness, to some advancement, to others energy, resolution, alertness, pluck, and zeal. There are no honorary members exempt from debt and duty. Fellowship dictates obligatory taxes, all must respond.

To the instructing, inspiring influence of these latter ideal organizations are due the deeds of statesmen, scientists, authors, orators and artisans. To their directing power we owe the birth of inventions of inestimable scope of utility. In school-boy days we gleaned much of interest about the Stone and Iron ages, but those epochs are mist-ridden now in latter years, when darkness is turned to brightest day, air into chilling, freezing liquid, and the products of the field into agents so destructive to human existence that one must needs shudder at the very mention of their might. It was no eccentric treasurer of obsolete fancies who modelled a way to cast a gleam of light upon mysteries buried deep in the human form; no disciple of fogey methods who corraled the voice of man into an organ of speech submissive, man-designed; no dweller in a realm of ancient notions who designed a substitute for human fingers that will more deftly set the metal characters that register for all time the thoughts of minds treacherous to themselves.

Modern men of modern mold were these, men whose exploits one well might emulate.

When you are advised by some self-asserted sage whose ideas are feeble and moss-grown, remember the reception with which Edison met when he exhibited one of his initial inventions: He was tersely told to devise something the public wanted. Not exactly pertinent but suggestive, surely, of the theme we here discuss. People of to-day want none of the methods of years gone by. They expect and demand from you an evidence of recognition and compliance to the advanced and advancing conditions of the present time. From rhyme and story can be had refreshment for the memory from which is fast fading the customs of our grand-fathers and their fathers before them. No need to have them exemplified by men to-day; men whose success depends upon their mode of living, their manner of conducting their worldly possessions. Cast aside any such illusive veil of ill-advice that hides from view your duty to the prevailing modes. Have an eye, an ear and a hand for current happenings, for the doings of ninety-eight. Keep up with the times. Take down the one bright-gilded mortar from before your door and freshen it anew. Sweep the dust from off the casements and all the the outer wood-work, gouge out the incrustations from the corners, and with paint and varnish, brush in hand, prepare to begin a new and illustrious era in the pharmacy you sway. Modernize the mountings of your store. If paint and putty are inadequate to the fullest demands of the closing century, call into service the hammer, nails and saw. Invest a little money in a dividend-declaring institution, a "sure thing." Let that proverbial "first impression" be one of progress and thrift; an impression that will be to the credit of you and yours and to the profession you follow. Peel off the time-stained, fly-specked paper from the walls. Untie the cords of hanging from old, dust-laden pictures. Tear down the sore-familiar drapings. Shift the counters or cases to lend an air of newness to the store. Find an improved and modern substitute for your antiquated soda fountain. Move aside the goods displayed in boxes and piles, and make room for some chairs for patrons to sit upon. Tolerate no awning, shade or curtain that obscures the light of day and makes the store dark and dingy. Dispel the gloom of night by methods up-to-date; be ashamed of the coal oil lamps and their modest efforts at lighting. (You may smile, progressive reader, but there are many still burning oil.) Loosen your grasp on the methods out-going and gone; get in line with the on-marching modes. Lay hold of a few of the flying tactics of trade and utilize them while they are timely. Have nothing of the stuttering systems condemned by prosperity. Give no time to thoughts of fogey, be-whiskered counsel, to musty ideas, mouldy notions or moth-eaten opinions. Listen to the talk of the times.

Keep your stock, your store and yourself advancing upward and onward with the ticks of time. Amid the din of advice, solicitation and adversity carry the banner emblazoned with that strange device, the modern motto of greater Gotham, "Excelsior," and reflect in all your achievements an observance of this emblem of progress. Don't be a mossback. Don't be a fogey. Don't become antiquated. Move with the times. Mingle with men of timely habits and disabuse your mind of the profits of old-fashioned methods.

HAVE YOU SYSTEM WHERE IT IS SELOOM SEEN?

In what condition do you keep the space to the rear of the counters—the store counters, proper? Can you move about freely without fear of stubbing toes or knocking something over? Any protruding boxes or cans to fall with noise and clatter? Any insecure shelving to endanger merchandise and the quiet of the store? Are things kept here in packages in higgledy piggedly heaps that must be heaved and tossed about to find a certain want? Is wrapping paper stored behind them, near the floor, where dust and blackened shoes will soil and mar it, to the detriment and loss of many sheets? Do all the containers put here boast corks, stoppers and lids? Is most everything taken from these parts to fill an order or accommodate a patron covered with a heavy film or layer of dust? Are soiled or fly-specked goods thrown hereabout to await your pleasure? If some fluid is spilled over the floor is it allowed to run at random where it

cannot be reached without suffering the inconvenience of moving stock? Ever lose any perishable goods this way? When scraps and balls of paper, corks, good and bad, old metal bottle caps, disfigured cartons, labels and label scrapings and what not, fall or are tossed to the floor are they allowed to remain there until they have worked their way between boxes, bottles and cans, and under things? Do you keep a receptacle or two in which these discarded things might be thrown? One behind the prescription counter, did you say? But didn't you read our first question?

Does any of the stock stored here show signs of water stains? How does the "boy" sprinkle the floor before he sweeps? Wouldn't it be better to use wet saw dust if he can't control the dirt in a less expensive manner? Did the carpenter leave any jagged boards or projecting nails to scratch the person, tear clothes or disturb the peace of mind? Wouldn't it be even better to perfect his unfinished work than to continually cry a warning or keep an anxious eye? Do you often root out these regions and make yourself familiar with their tenants? Don't you think it might surprise you? Do you accept the wrapping paper, almanacs, etc., from the manufacturers of proprietary preparations only to cast them beneath the counters to be forgotten? If so, why do you admit them to your store when you cannot conscientiously treat them? Would you have others use your advertisements so? And don't you know you are usurping space?

What about the soda counter? Can we find behind it an evidence of neglect? Are there syrup-daubed bottles standing in mute appeal for attention and a bath? Is your sink grime-besmeared and slimy? Are there sponges in it that have imbibed and lost water while they lay? Any of these in corners, on the floor, that are spoiling for a thought? Don't you know that a discolored sponge has no proper place about a fountain? Are there straws, tooth-marked and broken, scattered about the space? Is there a very much hand-soiled towel hanging here for use? If you dispense ice cream direct from the freezer isn't it better to hide the freezer and not let everyone judge the extent of sales—especially if it be a small one? Is the drain-board adequate to demands—large enough and set at the proper pitch? Is it sadly in want of repairs? Does it look so wet and sloppy back here that people feel inclined to ask, "Where are your boots?" Do you give this department an extra-careful cleaning after a warm-day rush or just the usual go-over?

Did you say that these parts and their appurtenances were seldom seen by any but those quite closely related to the store? Why, really, don't you know you remind us of the man who never blackened his shoes behind because it was not those parts he saw, and whose weakness the bootblacks discovered and made the best of to the extent that his boot heels went dirty all the time? See the connection, don't you? And can't you also see the fallacy of your excuse? Does not such a lack of attention teach your clerks neglect? Are you not endangering your reputation as a thorough up-to-date pharmacist when you reach down and bring up a dust-laden parcel or when you are forced to toss about boxes and packages to find a desired article? Do not your patrons pity your simplicity of style when you trip over obstructions and bump against boxes and bottles? Is there not here a palpable lack of discipline? Are these not stumbling blocks to decorum, concurrent forces that tend to fracture confidence and establish doubt and disapproval? Would it not be better were things not so? Then, aside from this, do not customers sometimes get a peep behind the counters, a look behind the scenes? Would you rather they saw these portions of the store in negligee attire or in evening dress? Your physicians have access to the entire establishment, more or less, have they not? Well? Are we making our point? Have we made it?

Berlin's "Royal Court Pharmacy" is now 300 years old. It was established by the Elector Joachim Frederick of Brandenburg, and had its quarters in the Royal palace until two years ago, when it was transferred to the Monbijou palace. The pharmacy supplies medicine to the whole Prussian Court, and to many of the Berlin hospitals.

IN THE LAND OF GINGER—JAMAICA.*

BY F. B. KILMER.

The books state that "Zingiber officinale, Roscoe (Amomum zingiber), is a native of Asia, and that it has been introduced into most tropical countries, and is now found in the West Indies, South America, tropical western Africa, and Queensland in Australia." But the vial handed over the drug store counter, even though it may contain a weak decoction of pepper, will invariably be labeled "Jamaica Ginger." In these notes we shall, therefore, study this plant as seen in its popular habitat, thus keeping in sympathy with the West India planter, to whom the only known spot where ginger grows is in his sunlit garden.

In the track of the ocean steamers sailing from New York or Liverpool toward the Southern Continent, as they pass from the cold grey waters of the Atlantic into the warm blue waters of the Caribbean Sea, at a point in the windward passage 100 miles west of San Domingo, 90 miles south of Cuba, lies Jamaica. Donnelly created his island of "Atlantis" in these waters. Assuming his story to be true, St. Jago, the gem of the Antilles—Ginger Land—is a favorable location for his Eden. By a vivid imagination we might, from the present inhabitants, trace a lineage back through Ham, and arrive at a picture of Adam planting ginger in the first garden. As the traveler approaches Ginger Land he is impressed with the magnificence and beauty he sees outlined against a perfect sky, terrace upon terrace of mountains upon mountains spring into view, dark purple mountains, rent by fissures, futing into the blue heavens. The shores are covered with lively green down to the water's edge; here and there a white spot, completely embowered in foliage, marks the plantations and settlements. Columbus formed a relief map of this island for his queen by crumpling a piece of paper in his hand. The landscape of Ginger Land is truly crumpled but picturesque, and the ginger plant grows luxuriantly on the steep sides of its crumpled elevations, from 2,000 feet up to the lofty summits of the blue mountain range. In gorges, in romantic glens, sinks, cockpits, valleys, through the ages there has been deposited a rich, humus soil, this is drained by innumerable streams, along the banks of which, among everblooming tropic flowers, ginger finds a congenial habitat.

One of the essential requirements for the growth of this plant is sunshine—Old Sol is here young, bright and active.

Another requisite for growth—moisture—is also here in plenty. In some portions, 281 inches, or 23 feet, is recorded as an annual down-pour. In the "ginger district," 88 inches, or over 7 feet, has been the mean annual rainfall for the last twenty years. (In a report made by one of my correspondents in this district, October, 1897, 47 inches, or nearly 4 feet, of rainfall was recorded in sixteen days.) While ginger grows at suitable elevations all over the island, it is mainly produced in the central western portion, along the borders of the parishes of Westmoreland, St. Elizabeth, Manchester, Clarendon, Trelawney and St. James. The underlying soil of this district consists of white and yellow limestone, with trappean formation; this is covered in some of the nooks or valleys with a pulverent mould or loam deposit several feet in depth. The plant grows luxuriantly in such soil, but apparently will not thrive in marshy soil, nor where there is present more than 10 to 20 per cent. of clay or 30 per cent of sand. The Government returns for the whole island give only about 250 acres of land devoted to ginger. This amount of acreage would not yield the crop harvested. But the real cultivation is not in acres, many cultivators having beds varying from 6 feet square up to the size of a building lot. A few cultivate from one to six acres. Large plots are very rare. For the most part, it is put in the ground in any convenient spot, alongside pineapples, yams, cocoa, cassava or other plants, often in the midst of a dense growth of bush or weeds.

In the statistics of this fertile island this article does not figure in pounds, shillings and pence as largely as do some of its other products. Economically speaking,

* Major portion of a paper read at a regular pharmaceutical meeting of the Philadelphia College of Pharmacy and reprinted from the American Journal of Pharmacy.

however, ginger is one of its most important articles of commerce. In my judgment, from 25,000 to 50,000 of its people are more or less dependent upon the ginger crop for such ready money as is essential to maintain their existence. The cultivation and gathering of this drug are largely in the hands of that peculiar class of West Indies peasants known as Quashie. Quashie is the title given the snuff-colored and brown people, as distinct from blacks, who make up nine-tenths of the inhabitants of the West Indies.

Though I know him well, it would be impossible to paint Quashie in words. To appreciate him, one must be in his actual presence. From a Northern standpoint he is poorly equipped for the battle of life; he is simple-hearted, unambitious, and intellectually poor. Life to him is not serious, nor very earnest. It is more like a sunny dream. He lives in a hut far back from the road, a home bordered in tangled foliage brilliant with flowers. It is one-storied, one-roomed, unfloored, thatched with palms, opening all around, plenty of ventilation, but it is orderly, clean and tidy. He has a buxom mate, numerous daughters, but few sons. Like him, they are all symmetrically east, clean, and full of tropical vitality. Food is more than abundant; it drops from the trees and springs up from the ground. Ever so few shillings pay the taxes, and supply clothing and all other wants, whether of necessity or luxury. He owes no man, and no man owns him. Thus, in humble surroundings, the typical ginger planter lives in more independence, ease and contentment than any dispenser of Jamaica ginger may even hope to attain.

The ginger planter is not given to taking in knowledge or giving out information. Long and vigorous cross-questioning will, in the end, only elicit the fact that he "doesn't rightly know" anything about ginger, or how much will be his own or his neighbor's crop. To the price of crop prospects, improvements in cultivation, difference in quality, he gives little thought or care. He divides ginger into "blue" and "yellow" from the color of the rhizome. These are also known as, respectively, "turmeric" and "flint." I was unable to see any botanical difference in the plant producing the two different colored root-stalks, and many intelligent planters were unable to distinguish the kinds without first examining the root. If anything, it seemed to me that the blue was a degenerate species. The root of the blue is hard and fibrous, yields a much less proportion of powder, is less pungent, and therefore less valuable commercially.¹

There is also a division into "plant" and "ratoon" ginger. Plant ginger is ginger that is planted each season; ratoon ginger is really a product of laziness. It is a return crop, secured by leaving a part of the "hand" containing a bud in the ground when the crop is harvested. Ratoon ginger is much smaller in size of hands than the planted, and loses each year in flavor, each successive year being less and less in amount.

GINGER PLANTING.

Ginger is planted in March and April. The planting process consists in burying the divided fingers, each division containing an "eye" or embryo, in trenches or holes a few inches below the surface and about a foot apart, similar to the process of planting potatoes. The small grower simply digs a hole in a convenient spot. The thrifty planter first burns over his plot, to destroy weeds and insects, then ploughs and lays the plot out into beds and trenches.

The growing plant needs plenty of sun, and the weeds and bushes must be kept down. This latter is a perplexing problem, unless the weeds have been destroyed before the ginger has been planted. If the weeds are pulled or the ground disturbed while the plant is growing, water is apt to settle around the roots, and this rots them. The average Jamaica planter is not given to work, and he generally lets the weeds and ginger solve the question by lighting it out for themselves.

The reed-like ginger plant, with its leafy stems, grows sometimes to a height of five feet; its cone-topped flowering stems reach from six to twelve inches, and, in a well-cleared field, make a pretty show when in their September bloom.

¹ I found some shippers in Jamaica ports who were exporting the undried "blue" ginger to supply the demand for green ginger as used in pickling and preserving.

On wet soil and during very rainy seasons the root is subject to what is termed "black rotten." This is a rotting induced by warm, soggy soil. The root swells in spots, fills with water, turns black, and emits an offensive odor. In this condition it is attacked by insects and worms, which has given rise to the belief among the planters that the rotting is caused by a so-called ginger worm. (It is possibly a fungus disease.)

Growing ginger must be well watered. Irrigation is practiced to a limited extent, but in most of the parishes this is unnecessary, as the rainfall is abundant. Fertilization, though highly important, is rarely attempted, partly owing to the small profit, but largely owing to the customs of the country. The most that is ever done is to plough in the weeds and cover the ground with banana trash. Rarely will the planter ever gather up the manure from his live stock and throw it on the ginger-bed. There are no stables used in Jamaica, therefore no such thing as a compost heap. Sea weeds and watering the beds with sea water have been tried experimentally with good results; but no matter how large-sized roots or how fine a quality would be yielded, the average planter would not take the trouble to work his ground in a scientific manner.

An all-important feature is the rapid impoverishment of the soil that follows the ginger culture. One planter told me that only ferns would grow on the soil after exhaustion by this crop. There is thus a constant demand for virgin soil to secure the best-paying crops. This is attained by sending valuable timber up in smoke, as one authority tersely expressed it, "Dried-up streams, general barrenness, in fact a wilderness mark the progress of ginger culture."

The situation is clearly summed up by Mr. William Fawcett, Director of Public Gardens for Jamaica, from whose report to the Honorable Colonial Secretary I quote:

"The soil which produces the very highest quality ginger, realizing, perhaps, £10 per cwt. in the London markets, is the very deep black soil of virgin forest. To grow ginger under this condition involves the destruction of large areas of forest. Magnificent trees, six feet in diameter, may be seen in some districts lying rotting on the ground, while the ginger cultivators have gone further to the centre of the island, abandoning the woodlands already cut down. The plan adopted in clearing a forest is for a cultivator to invite ten or twelve of his friends to a 'cutting match.' He provides food and drink, and the laborious work of felling trees is carried on merrily and without much expense. Afterwards, fire is put and the place is burnt over. This burning is considered very important, as much so as the virgin soil.

"Probably its importance is due principally to the deposit of potash and other mineral matters contained in the ashes, but the fire will also sweeten the ground, correcting sourness; and, moreover, it destroys insect pests. Some cultivators will only grow ginger in freshly-cleared woodland, and next year they move on to a new clearing; but although in this way they get very fine ginger, it is at the expense of forest land which would require a heavy outlay and perhaps a term of 100 years to restore. Albert Town was not long ago a great centre for the cultivation, but I was told there that growers had already got as far as fourteen miles further inland.

"Ginger can be, and is, grown in many places year after year on the same ground. An intelligent cultivator at Borbridge stated that he knew of ginger growing for forty years in the same patch. Sanford Town is a German colony, and one of the original colonists, Somers, an active old man of eighty years of age, has been cultivating ginger and arrowroot there since his youth. He and the other colonists have been in the habit of planting a small patch one year, leaving it to ratoon as long as it was profitable, then throwing it up or growing other plants until, after a term of years, they again plant the same patch with ginger. This is an irregular rotation of crops, 'plant ginger,' the product of planting, is of better quality than the ratoon, and the ratoons in each succeeding year are inferior. When the ground is too poor to grow 'white ginger,' the 'blue ginger,' the inferior variety, can be grown.

"More depends upon the curing of ginger, considering

the crop, as a livelihood, than soil. I believe that the badly-cured ginger brought sometimes to the market is due to wet weather, rather than to want of care.

"The export of ginger is, on the whole, on the increase, but if this is accompanied by the gradual destruction of woods and forests, it is not a subject of congratulation."

An examination of the exhausted soil revealed the fact that it was deficient in organic matter, lime, phosphoric acid and soda. Attempts made, at my suggestion, to supply these deficiencies by the use of market fertilizers of various kinds were not productive of any favorable results. Stable manure alone resulted in a failure, as likewise did the use of a bat guano found on the island. The use of marl, especially when mixed with stable manure, was a partial success.

The Jamaica Agricultural Society, in 1895, began a series of practical experiments, which are still in progress. Their first results gathered in February, 1897, were somewhat affected by a drought in the previous November. Upon a limited area of worn-out land, which, in a check experiment gave no return, they secured a crop which would be equivalent to over 2,500 pounds of cured per acre, and the product was of extraordinary size and quality. The fertilizer which aided in bringing this result was a mixture of marl with a compound fertilizer made up of about 10 per cent, each of soluble phosphates, ammonia and potash salts. These results were very encouraging, and the society have extended them by securing larger plots, giving aid to planters in the way of furnishing fertilizer, etc., returns from which will be gathered in the spring of 1898.

The solution of the problem of reclaiming land exhausted by the ginger and other crops, and the prevention of the further wasteful destruction of valuable soil, is in Ginger Land, one of great moment. There is in this fair island thousands upon thousands of acres of abandoned land, lying within easy reach of roads and ports. Much of it has been abandoned because the soil has been exhausted by ginger or coffee. If by suitable tillage and manures it can be reclaimed, great benefits to the inhabitants will follow.

Ginger, as we know it, is the root-stalk of the plant. The root proper or root fibers are about one-half inch long, not very numerous, dying off as the rhizome advances and leaving a slight scar. As regularly shaped hands, with more or less straight fingers, command the higher price in markets, experiments were made to secure a regular shaped growth. Owing to the peculiarities of the native planter, instructions were not closely followed, and the results were unsuccessful. The fact was developed that a sprout starts from the parent eye, and from this stem, in turn, lateral shoots or branches develop in pairs. The side branches again develop in pairs, these pairs generally alternating to opposite sides. It was found that if the soil was well worked and pulverized before planting, the growth was straighter than when planted in hard soil. Some difference was noted also in the condition of the parent plant. If this was well developed and vigorous, the resultant root-stalk was of a better type than where the parent was small, gnarly and crooked. The Botanical Department is now experimenting with selected plants.

(To be concluded next week.)

LIANTHRA. (extr. olei lianthracis) is a preparation stated to be an extract of coal tar, which is mixed with 10 to 20 per cent. of casein ointment. (Ph. Post.)

GNORHOL.—Under this name a preparation has recently been placed on the market, which is stated to consist of about 90 per cent. of the active constituents of oil of santal and is recommended for gonorrhoea. It is a colorless oil having a feeble odor of sandal wood, and soluble in 70 per cent. alcohol. (Ph. Post.)

SYRUP OF ALTHEA.—The followed method of preparation is recommended: Marshmallow root 2 parts, alcohol 1 part, distilled water 2 parts. The well washed root is macerated for 3 hours with the alcohol and water and then percolated. Ten parts of percolate are collected, which are brought to a boil in a closed vessel and filtered. This extract keeps well in a cool place. One part of it is mixed with 9 parts of simple syrup. (Ph. Ztg.)

PHARMACY.

TO PREVENT RUSTING OF METALLIC SURFACES it is recommended to melt together 125 parts of lard and 20 parts of camphor, to which a little graphite is added. After thorough cleaning the mass is rubbed on and allowed to remain 24 hours. (Ap. Ztg.)

LIABILITY FOR SPECIAL TAX.—Druggists should bear in mind that the sale of beer, or of distilled spirits, wine, or other alcoholic liquor, which has not been compounded with drugs or other medicinal substances, involves the seller in special tax liability, under the Internal Revenue laws, and he cannot escape this liability by showing that the liquor was sold under a label as a medicine.

ANTISEPTIC CATGUT AND SILK THREAD are prepared by Dr. R. Tomalla (Klin. Wochschr.) in the following manner: They are sterilized and then immersed in a solution of formaldehyde—gelatin. After some time the threads are taken out and dried in a sterilized room. In the use of these the gelatin is dissolved in the wound and formaldehyde set free, which destroys any bacteria present. (Ap. Ztg.)

TREATMENT OF ECZEMA WITH PICRIC ACID.—According to Brousse (L'Union Ph.) and others, picric acid is very useful in the treatment of acute eczema. It is best used in form of a saturated aqueous solution, which is painted on the affected parts with a brush, after cleansing and application of antiseptics. The painted parts are covered with a dressing consisting either of cotton alone, or of compresses saturated with the same solution.

DISTILLATION OF PEPPERMINT OIL.—A recent ruling of the Internal Revenue Department brings out the fact that there is no special tax imposed on oil of peppermint, nor is there any special tax required to be paid for its distillation, but it is held that every still capable of being used for distilling the spirits defined by the revenue laws (even when it is not so used, but is intended to be used for the distillation of oil from herbs) must immediately, upon being set up, be registered with the Collector of the district, under Section 3258, Rev. Statutes.

WOOD FLOUR is a substance manufactured dry from wood ground between millstones, and is principally used as an absorbent in the manufacture of dynamite and other high explosives, and to some extent in the making of wall paper. It differs from wood pulp proper in the fact that the latter is ground or crushed in a wet condition, and afterwards passed over felt-covered cylinders to press out the water, and then rolled into sheets, in which condition it is bought and sold commercially, and is chiefly used in the manufacture of paper.

UTERUS-BOUGIES.—Dr. R. Klien proposes a mixture which is claimed to be superior to cacao butter and tragacanth for the preparation of bougies. It consists of milk sugar, acacia, egg albumen and glycerin and is readily formed into pencils, that remain elastic when they are wrapped separately in wax paper. The mixture is also well suited for the incorporation of medicinal substances and a particular advantage is its ready solubility, which assists in bringing about a prompt effect of the remedy. (Ph. Post.)

SYRUP OF RHUBARB.—Macerate during 12 hours 1 part of rhubarb, 1 part of potassium carbonate and 1 part of borax, with 10 parts of water at ordinary temperature, with occasional stirring. Strain and collect as much of the fluid as possible by expressing the residue. Make the liquid up to 18 parts with water, bring to a boil and filter after cooling. Then add 2 parts of alcohol and 2 drops of oil of cinnamon for every ounce of liquid. The syrup is prepared from this by mixing 1 part with 9 parts of simple syrup. (Ph. Ztg.)

THE STATUS OF INFANT INCUBATORS.—The Treasury Department has ruled that infant incubators are not philosophical apparatus, utensils, nor instruments, within the meaning of paragraph 628 of the Tariff Act of 1897, and therefore they are not entitled to entry free of duty.

ANIMAL ORGANS AS ANTIDOTES FOR POISONS.—In *W. Med. Pr.* the observation is made by Widal and Nobécourt, that certain animal organs possess antitoxic powers. Thus, the brain and spinal marrow of healthy rabbits neutralize the toxic effects of strychnine and morphine, while the suprarenal capsules are antidotes for nicotine, the liver in phosphorus poisoning. While blood and its serum are totally indifferent in this respect, the nerve-substance has the most pronounced effect of all organs. (*Ph. Post.*)

FERMENTED LIQUOR made from oranges, sugar and elder blossoms is held by the Commissioner of Internal Revenue to be a wine within the meaning of the Internal Revenue laws. The special tax of a liquor dealer is required to be paid for its sale. This ruling was made in reply to an inquiry from a resident of Pittsburg who asked if the liquor manufactured from the following formula was subject to tax: "3 pounds sugar, 3 oranges, 1 quart elder blossoms, 1 tablespoonful yeast, 1 gallon water, all of which is allowed to ferment and is then bottled."

TESTING SODIUM BICARBONATE FOR MONOCARBONATE.—A. Leys (*Ann. Chim. Anal.*) recommends for this purpose a saturated solution of calcium sulphate. This gives with a solution of pure sodium bicarbonate only a fine crystalline precipitate of calcium sulphate; in presence of carbonate a white turbidity of amorphous calcium carbonate immediately appears. Commercial sodium bicarbonate is never entirely free from carbonate, and it is therefore necessary to make comparative trials with a standard sample to determine approximately the amount present. (*Südd. Ap. Ztg.*)

PRESERVATION OF SYRUP OF IODIDE OF IRON.—K. Wolf (*Ph. Post.*) recommends to fill the syrup in small bottles up to the neck, pour a thin layer of oil of almond on the top, to exclude the air completely, and finally close with a good cork. Before using, the oil is taken up with a little absorbent cotton. The syrup can be kept in this manner for years without visible change either in the dark or exposed to light. When no oil is added, but the cork sealed with paraffin, it can be seen that even the small quantity of oxygen contained in the neck of the bottle is sufficient to darken at least the upper part of the syrup after some time.

DISTINCTION BETWEEN BAY AND LAUREL LEAVES.—The following distinction is made between bay and laurel leaves by the Assistant Secretary of the Treasury in charge of the collection of customs. The bay tree is known botanically as the *Myrica neri*. It is indigenous to Jamaica and the West Indies, and from the leaves thereof oil of myrica or bay is distilled for use in the manufacture of bay rum. Laurel, on the other hand, is a name properly belonging to the *Laurus nobilis*, the sweet bay tree of countries bordering on the Mediterranean Sea. The leaves of this tree are larger than those of the bay tree and full of small veins, and are imported principally for cooking purposes.

CHARACTERISTIC REACTION OF COTTONSEED OIL.—A reaction discovered by Halphen (*Ann. Chim. Anal.*) consists in a red coloration of the oil when treated with carbon disulphide. The intensity of color varies somewhat with different brands, but the reaction is not given by any other oil. To test an oil for presence of cottonseed oil, put into a test-tube equal volumes of a 1 per cent. solution of sulphur in carbon disulphide, amyl alcohol, and the oil to be tested. Mix and immerse the tube partially in a bath of boiling water for 10 to 15 minutes and observe the color. A red or orange color proves the presence of cottonseed oil. If the result is negative, add about 1 Cc. more of the carbon disulphide

solution of sulphur and warm 5 to 10 minutes, if necessary repeat once more. If no red color appears after the third treatment, absence of cottonseed oil may be concluded. (*Zeitsch. f. Ph.*)

PRESERVING PLANT COLORS.—A. F. Woods in *Botanical Gazette* (*Sci. Amer.*), describes a method of preserving the green color of plants for exhibition purposes which appears to be similar in principle to the coppering of green peas. Air is removed as completely as possible from the surface and intercellular spaces of the plants by immersion in 90 to 95 per cent. alcohol, or an airpump may be employed. The plants are next immersed in dilute glycerin (5 per cent.) to which a bluish tint has been imparted by means of copper sulphate or acetate. The copper combines with the chlorophyll, forming copper phyllocyanate, which is practically insoluble in any ordinary preservative medium except strong alcohol, and is not affected by light. Any excess of copper salt may be dissolved out by a mixture of dilute glycerine and formalin, which may also be employed with advantage as the preservative medium.

ARSENIC ANTIDOTES.—Dr. Kraft has experimented with the ferric hydrate antidote as ordinarily prepared and finds the following the most practical: Dialyzed iron, distilled water, of each 200 Gm., burnt magnesia 5 Gm. The magnesia is mixed with the water and dialyzed iron added to this when required.—C. Glücksmann, after numerous experiments, comes to the conclusion that extemporaneously prepared magnesium hydrate is a much more rapid and surer antidote than ferric hydrate. It is also stated to be less injurious to the stomach when taken in large quantity, than a corresponding amount of ferric hydrate. The formula recommended is as follows: (1) 50 Gm. of magnesium sulphate are dissolved in 500 Cc. of water and (2) 15 Gm. pure sodium hydrate are dissolved in 500 Cc. of water. Both solutions are to be kept on hand separately and when required mixed in equal volumes. The mixture contains an excess of magnesium sulphate, which is necessary to avoid an excess of sodium hydrate. The sodium sulphate formed in the reaction is said not to interfere with the action of the antidote. (*Südd. Ap. Ztg.*)

SHEEP DIPS.—According to the information furnished the Board of Appraisers at New York in a case where the rate and amount of duties chargeable on certain merchandise entered as "sheep dip" were protested, the Board found that there are three general kinds or classes of compounds or preparations imported, or to be found in the markets of the country, which are used more or less as sheep dips, and are bought and sold under that name; viz.: (1) those made out of coal tar products (cresylic acid, dead oil, etc.) and which can also be and are used for disinfecting purposes and for destroying parasites other than those found on sheep, and insects on plants; (2) the so-called tobacco sheep dips can be and are used for destroying parasites and insects generally; (3) preparations containing arsenic, usually mixed with sulphur, and which are used almost exclusively as sheep dips. In the case under protest the Appraiser, in a special report to the Collector, enumerated, as a result of an exhaustive inquiry, thirty-nine different (more or less important) uses for which the product is advertised for sale and recommended to the public other than sheep dip. Among these, to beautify and improve the human skin, coats of animals, furs and fabrics of all kinds, the removal of grease from the skin, wearing apparel, carpets, etc.; the cleansing and polishing of plate, copper and other metals; to cleanse the hair, and as a substitute for violet powder for children; to prevent chafing, chaps and chilblains, to cure cracked heel, heal wounds and sores; as a gargle for the throat; preserve the teeth and purify the breath, as a wash for horses, cattle and dogs; to destroy flies, fleas, vermin, insects, crickets, spiders, etc.; to prevent smut in wheat; to destroy wire-worm, and to kill diseases in potatoes, to destroy insect pests in vines and fruit trees; as a disinfectant in toilets, drains, sewers, dust bins, hospitals, school rooms, barracks, butchers' and fish-mongers' markets. The merchandise in question was held to be dutiable.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Extractum Halish Sativa.

(J. H. B.) "Extractum halish sativa" is one of the ingredients of a fake prescription repeatedly exposed in the pharmaceutical journals. The "extract" has no existence and therefore no English name.

Tincture Vanilla.

(A. E. D.) The Pharmacopœia affords a most satisfactory formula for tincture of vanilla. Formulas for extract of vanilla may be found in the issues of this journal August 12, 1897, page 207 and January 27, 1898, page 150.

Lubricating Oil for Trombones.

(J. H. P.) You can buy from manufacturers and jobbers of musical merchandise oil sold to be specially prepared for lubricating the sliding tubes of trombones. We are informed that the liquid hydrocarbon oils like liquid alboline, liquid vaseline, petrolatum, etc., may be very satisfactorily employed for this purpose. They do not corrode the brass and the instruments are very easily cleaned.

Cream of Roses.

(W. S.) The formula for this preparation (Era Formulary, No. 1838), in our opinion, contains too much glycerin. We suggest the following modification:

Spermaceti	4 drams
Oil sweet almonds	2 ounces
White wax	1 ounce
Glycerin	1 ounce
Rose water	1½ ounces
Borax	20 grains
Attar of rose	Q. S.

Melt the spermaceti and white wax at a moderate heat, add the oil of sweet almond, transfer to a warmed mortar, add the rose water in which the borax has been dissolved, and the glycerin, and stir continuously until the whole becomes soft and creamy.

Soda Water Frappes.

(E. E. S.) We compile the following:

Coffee.

Iceing or shaved ice	2-3 glassful
Coffee syrup	1½ ounces
Cream	1 ounce

Draw into a 12-ounce glass, fill the latter with carbonated water, stir well and serve with a spoon.

Cocoanut.

Shaved ice	2-3 glassful
Orgeat syrup	2 ounces
Grated cocoanut	2 ounces
Ice cream (vanilla)	1 ounce

Mix with spoon, fill up with soda and mix again. Sprinkle a little cocoanut on top and serve with straws (Bonham).

Chocolate.

Iceing or shaved ice	½ glassful
Vanilla syrup	1 ounce
Chocolate syrup	1½ ounce
Coffee syrup	1½ ounce
Sweet cream	½ ounce
A dash of bitters.	

Fill up with soda, mix with spoon and serve with straws.

Lemon.

Lemon ice, about	4 ounces
Lemon syrup	1 fl. ounce
Water, enough to fill a 12-ounce glass.	

Ambrosia.

Juice of one-half lime	
Ambrosia syrup (see below)	1 fl. ounce
Shaved ice	½ glassful

Mix in a 12-ounce glass, shake vigorously, fill the glass with the coarse stream of carbonated water, and serve with straws.

The author of "Manual of Beverages," from which the above is taken, recommends the following formula for the preparation of ambrosia syrup:

Raspberry syrup	32 fl. ounces
Orange syrup	16 fl. ounces
Pineapple syrup	16 fl. ounces
Soda foam	Sufficient

Orange.

Juice of one orange	
Raspberry syrup	½ fl. ounce
Lemon juice	1 fl. dram
Sugar	1 tablespoonful
Shaved ice	½ glassful

Add several fluid ounces of carbonated water, stir well, strain into an eight-ounce glass, and fill the latter with the coarse stream of plain "soda" water.

Maple.

Maple syrup	1 fl. ounce
Vanilla syrup	1 fl. ounce
Water ice, plain	2-3 glassful

Draw into a 12-ounce glass, add a spoonful of ice cream, fill the glass with the coarse stream of carbonated water, mix the whole thoroughly, add a small quantity of crushed pineapple and serve with a spoon.

Sirup Despuratif.

(C. C. D.) We are unable to find a formula for a preparation under the above title in any of the reference works at hand. "Sirup depuratif" quite generally quoted by French writers on pharmacy may be the preparation wanted. Dorvault (L' Officine) gives at least eight formulas from which we take the following:

Sirup dépuratif (Larrey).

Sarsaparilla, cut and bruised	200 parts
Guaiac wood, rasped	50 parts
China root (Smilax china), in coarse powder	5 parts
Sassafras, rasped	5 parts
Senna	6 parts
Borage (Eurago officinalis)	6 parts
Elder juice (inspissated)	40 parts
Molasses	500 parts
Sugar	500 parts
Water	Q. S.

Boil the sarsaparilla, guaiac wood and china root for half an hour with enough water so that 720 parts of liquid may be separated from the drugs. Add to this liquid the sassafras, senna and borage; let the whole macerate for an hour and strain. Then mix the strained liquid, which should amount to 700 parts, with the other ingredients. This formula is somewhat modified by other authors who employ honey instead of molasses as given above. Sometimes aromatics like anise, etc., are also introduced.

Petrification; Adipocere.

(D. J. F.) We do not know that flesh ever petrifies, though such changes have been reported. It is stated on pretty good authority that in most of the instances reported where human bodies have been found in a state of so-called petrification, the changes observed were not due to petrification at all, but that they were due to the formation of adipocere. These changes are discussed in the following abstract of a cyclopedic article upon the subject and it probably contains the information you seek: Adipocere is a white, non-putrescible substance, into which human bodies are sometimes converted after burial. If the dead body be left exposed to the air at a moderate temperature, it undergoes the process of putrefaction, and is rapidly decomposed with the evolution of offensive and putrefactive gases. If buried in closed coffins with a limited supply of air, or in a tolerably dry soil, the process is somewhat modified; the putrescent character of the changes is less marked, the offensive effluvia are much less abundantly developed or are absorbed by the soil, and the body slowly decomposes, losing its original form and structure, and finally crumbling away to powder, leaving only the bones, which remain for a long time after the remainder of the body has become unrecognizable. But occasionally it has been found that bodies disinterred after the lapse of many years have not undergone either of these changes, but on the contrary have been converted into a white, solid, and very heavy substance, of firm consistency, retaining the original size and contour of the frame, so that the features may still be distinguishable, and even the natural markings and texture of the skin distinctly ap-

parent. This substance is adipocere. It does not putrefy, but has evidently remained unchanged for a long time while buried, and after disinterment continues with but slight alteration. After exposure to the air it simply becomes lighter in weight, drier and more granular, owing to the evaporation of the water which it contained; so that a body which has undergone this conversion may be afterward preserved for an indefinite time without changing materially in form or appearance. It is this change or conversion of the soft parts into adipocere, which gives rise to the instances occasionally reported of human bodies being found after some years in a state of so-called petrification. The white color, solidity and weight of the bodies thus found naturally suggest to the popular mind the idea of their having become petrified; but the change which they have undergone is in reality a very different one, and has little or nothing in common with a true petrification. It is found that, for a body to become changed into adipocere, two principal conditions are mainly requisite. First, the body at the time of its burial must be fat. Lean bodies, as a rule, do not undergo the change in question, but only those which are abundantly supplied with adipose tissue. And yet it is not the adipose tissue itself which is converted into adipocere; it merely supplies some of the necessary elements, which are employed in effecting the alteration in other tissues. The second necessary condition is that the body should be buried in a moist place, and one in which the water collects in considerable quantity and remains standing at or about the level of the coffin without being rapidly changed. Thus a single body, buried in marshy ground, or even deposited in a tomb which is undrained and collects standing water, will sometimes be found to have undergone the alteration.

The process of the conversion of a human body into adipocere under such circumstances appears to be the following: The fatty substance of the adipose tissue first undergoes a change, by which it becomes rancid and produces two fatty acids—oleic and margaric acids. These acids are liquid, and, being in large quantity, penetrate the neighboring tissues, so that the skin, muscles, etc., become permeated and saturated with them. At the same time the albuminous matter of these tissues, beginning to undergo decomposition, produces a small quantity of ammonia, which unites with the fatty acids, making an ammoniacal soap. The greater part of these acids, however, is taken up by combinations of lime, forming an oleate or margarate of lime, substances comparatively insoluble and non-putrescible. The lime is derived partly from the soil, being brought down in solution by the rain water as it filters through successive layers of superincumbent earth. If other bodies are piled above the water which filters through also brings the products of their decomposition and partial solution, among which are ammonia and lime, until the whole of the fatty acids of the bodies lying at the requisite level have combined with these bases, and have become in this way converted into adipocere. Thus the tissues, already permeated by the fatty acids, are now saturated with their ammoniacal and calcareous combinations, and especially with the oleate and margarate of lime, which protects them from further decomposition, and causes even their minute anatomical structure to be indefinitely preserved. These bodies, when first taken out, are dense and heavy, owing to the abundant moisture which they contain; but this soon evaporates after exposure to the air, leaving them comparatively tight and dry. It is not by any means all the tissues and organs of the body which are converted into adipocere, even under favorable circumstances. The adipose tissue itself disappears more or less completely, since its principal ingredient is used up in accomplishing the alteration of other parts. The internal organs generally, such as the heart, lungs, brain, liver, spleen, kidneys, etc., become shrivelled and disintegrated and finally undistinguishable. But the skin, fascia, tendons, fibrous membranes generally, and especially the muscles of the head, limbs and trunk, are all more or less completely preserved. The muscular texture is easily recognizable by the naked eye, and the natural folds of the skin, or accidental impressions made upon the surface by portions of the dress or ligatures, may be plainly discernible after the lapse of many years. The bones, teeth, hair and other less destructible parts of the body do not seem to be particularly influenced by the change, but undergo only the usual very

slow and almost imperceptible alterations which they would present in ordinary cases.

That condition sometimes found in the living organism and described by physicians as "petrification of the tissues," is brought about by the deposit in them of salts of lime and magnesium. The causation of this calcareous degeneration has been frequently discussed. Taylor says the degeneration, for such it is, occurs only in those parts which have been injured, or have lost their vitality; and even then the calcareous salts are not properly united with the tissues; they are merely infiltrated through, and deposited in them. The deposits may, therefore, be regarded as foreign bodies; or, rather, any part of the organism which has lost its vitality may be looked on, to a certain extent, as dead matter, which, acting as a foreign substance, causes the lime salts contained in the blood to be deposited thereon; it is a petrification from the blood, and not a change produced by any secreting power of the tissues involved. For its complete fulfillment it is necessary the circulation in the part should be slow.

Printing-Press Rollers.

(G. C. McD.) To eight pounds of transparent glue add as much water as will just cover it, and occasionally stir it during seven or eight hours. After standing twenty-four hours, and all of the water is absorbed, submit it to the action of heat on a water-bath until the glue is all dissolved. Remove from the fire as soon as froth is seen to rise, and mix with it seven pounds of molasses previously made tolerably hot. Stir the composition well together while heating, but do not allow to boil. After being thus exposed to the heat for half an hour, and frequently well stirred, it should be withdrawn from over the fire and allowed to cool a short time, previous to pouring it into a cylindrical mold made of tin, tinned sheet iron or copper, having a wooden cylinder previously supported in its center by means of its end pivots or gudgeons. After remaining in the mold at least eight or ten hours in winter and a longer time in summer, the roller is to be taken out of the mold by means of a cord fastened to one of the gudgeons, and passed over a stone pulley fixed to the ceiling. Old rollers are recast in the same manner, first taking care to wash them with a strong alkaline lye and adding a small quantity of water and molasses. The best mode, however, of making use of the old composition is by mixing it with a fresh batch made of two pounds of glue and four pounds of molasses.

(2.) The Scientific American Cyclopaedia of Receipts gives the following formula for the "mysterious black composition, so durable and elastic, and known to but few persons until recently":

Best glue.....	10½ pounds
Black molasses or honey.....	2½ gallons
India rubber, dissolved in oil of turpentine.....	1 pound
Venice turpentine.....	2 ounces
Glycerin.....	12 ounces
Vinegar.....	4 ounces

Purified India rubber only is used. To recast, add 20 per cent. of new material.

(3.) Take an equal quantity of good glue and concentrated glycerine: soften the former by soaking it in cold water, then melt it over a water bath, gradually adding the glycerine. Continue the heat until the excess of water has been driven off, meantime constantly stirring. Cast in brass or bronze moulds, well oiled.

(1.) Strong Medium Weather Rollers:

Copper's best glue.....	8½ pounds
Extra syrup.....	2 gallons
Glycerine.....	1 pint
Venice turpentine.....	2 ounces

Steep the glue in rain water until pliant. Drain it well. Then melt it over a moderate fire, but do not "cook" it. This step in the process takes from 15 to 25 minutes, when the syrup is added, the mixture boiled for three-quarters of an hour, stirred occasionally and the impurities arising to the surface skimmed off. Add the glycerine and Venice turpentine a few minutes before removing from the fire, and pour into the moulds slowly. Slightly reduce or increase the glue as the weather becomes colder or warmer.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, MAY 19, 1898.

No. 20.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates:

U. S., Canada and Mexico, ... \$3.00 per annum.
Foreign Countries in Postal Union, ... 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483,
Cable Address: "ERA"—New York, N. Y. NEW YORK.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL 735	Stearns & White's New
Handling of Pills, Tablets	Laboratory; Pitcher Me-
and Triturates 738	dicine Co. Enjoined;
ERA COURSE IN PHAR-	New York Bowlers Win. 758
MACY 739	Perfumers on the Stamp
Inorganic Chemistry 739	Tax; Antipyrine Re-
Pharmaceutical Processes. 741	duced in Price 759
In the Land of Ginger—	NEWS LETTERS 759
Jamaica 744	BUSINESS RECORD 768
Germs: What They Are	Kings County Society 767
and How They Produce	Druggists and Doctors
Disease 747	Meet 768
Ipecacuanha 749	BOARDS 769
QUESTION BOX 750	COLLEGES 770
PHARMACY 752	Miscellaneous 771
NEWS AND TRADE DE-	PATENTS 772
PARTMENT 753	OBITUARY 772
The War Revenue Bill 753	STATE OF TRADE 773
Testimonial to Col. Weiler 757	MARKET REPORTS 774

THE NEW ERA PRICE LIST.

Just as we had finished, ready for the printer, the compilation of the Era Price List of drugs, chemicals and patent medicines, which had been promised to our subscribers, there arises the certainty, or at least the probability, that the proposed Internal Revenue Stamp Act, now under discussion at Washington, will, when passed, necessitate a very radical revision of the prices on a great majority of the proprietary articles included in this list. Until this matter of the future prices of these goods is definitely settled by a revision of manufacturers' and jobbers' prices, it would be unwise to publish this Era Price List, and we accordingly announce its postponement a short time longer. While this delay is regretted, its wisdom and necessity will be recognized by our readers, who will appreciate the more a Price List which is first available in the event of changes in prices.

The War Revenue Bill.

The war revenue bill has been reported to the Senate by the Finance Committee. It is vastly different from what it was when first referred to the committee. The most important change, so far as the drug trade is concerned, is that the committee, having heard the protests of dealers in proprietary medicines and articles, perfumeries and cosmetics, mineral waters, chewing gum, tobacco, snuff, cigars and cigarettes, against the provision of the bill requiring all such goods in stock to be stamped before being offered for sale, have amended the measure so that such articles in stock will not have to be stamped before being sold. Mineral waters were exempted altogether. This is very welcome news indeed, but it is important that other and equally desirable changes be made before final enactment of the measure. Relative to the proposed tax on proprietary goods many opinions are expressed as to what percentage of value such a tax should be, what classes of goods should be included, and how the tax should be put into operation. There is a growing sentiment among those who are giving the subject serious consideration, that there is a great opportunity in this matter for Congress to pass a law that may be a benefit to proprietors—one that will not be a burden to the dealers, and, at the same time, furnish the desired revenue. In nearly all lines of manufactured merchandise the tendency is to put up one's goods in proprietary form. This is the legitimate result of competition, as it gives an individuality to each man's goods, holds him responsible for their quality and gives him the benefit of subsequent orders.

All large manufacturers of proprietary goods are constantly harassed with imitators and counterfeiters, and a revenue stamp of special design attached to any package of proprietary goods would be an additional protection from these imitators and counterfeiters. The counterfeiter would hesitate before he would counterfeit Uncle Sam's stamp, as well as the manufacturer's package. A number of manufacturers have expressed their desire for this additional protection, provided it can be secured without too largely increasing the cost of their goods.

Suppose, for example, that the tax on proprietary goods was reduced to, say, 1 per cent., and the stamps issued on the decimal system, so that articles selling for 10 cents or less would pay a tax of one-tenth of a cent; for 20 cents or less two-tenths of a cent; for 30 cents or less three-tenths of a cent, etc. Such a series of stamps would be a great convenience to those who are compelled to use them, and a uniform tax of 1 per cent. on all lines of proprietary goods would be easy to remember and to operate; would furnish ample revenue and would not be a hardship upon a few classes of manufacturers.

There is a strong feeling that the provisions of the bill should be applied to all classes of proprietary goods in all lines of business, including every retail package put up by a manufacturer who claims any protection from the United States laws for such package. Why should not the patent soaps and washing

compounds, Sapolio, Pearline and baking powders bear their share of this burden? It certainly cannot be claimed that the proprietors of these goods are not fully able to pay the tax, and are these articles any more of a necessity than a bottle of spring medicine? Is the manufacturers' profit on these grocery specialties any less than it is on the average patent medicine?

The Sale of Carbolic Acid.

Carbolic acid has always been a favorite with suicides. It is employed for self-murder more, perhaps, than all other agents of destruction put together. Why this is so is hard to explain; probably, in the first place because it is so easy to procure, and in the second place because of the general ignorance of the public concerning poisons. Surely if the would-be suicide knew there were poisons which would effect his painless separation from earth's sorrows and burdens, he would not employ carbolic acid to burn out his life, inflicting the horrible agony always attending its employment.

But the first reason is doubtless the more potent. Carbolic acid is cheap, easily procurable and nobody seems to ask any questions about its use.

Carbolic acid is an article of very broad and legitimate household service, a fact which makes it very difficult to so hedge about its sale that it shall not be used for suicidal or criminal purposes. It differs in this respect from most other poisons, which have little beyond a medicinal use, and may, therefore, be restricted.

In most States the seller of carbolic acid must label it "poison," etc., but in few is it required that the sale, purchaser's name, etc., be duly registered in the poison record book. We believe this latter requirement should be established. The very little hardship it would cause would be offset a thousand fold by the good it would do. Of course, no regulations can ever succeed in preventing entirely suicide by poison, but every additional restriction placed around the sale of poisons makes it proportionately more difficult to secure the agent of death.

Beside the laxity of the laws and restrictions applying to the sale of carbolic acid, there is undoubtedly some carelessness and recklessness on the part of the druggist in its sale. Though not legally required to do so, he should observe every precaution, in every way endeavor to prevent the use of this agent for self-murder. The druggist has a higher duty than that of most tradesmen. His responsibility does not rest in and end with the mere sale of his goods. He is, to a large extent, the guardian of the health and lives of the people; he is, in very truth, his brother's keeper.

Is This a New Motive Power?

At a recent meeting of the Franklin Institute, Philadelphia, there was a demonstration which not only elicited much discussion from those who witnessed it, but has, through its published description, excited the interest of mechanical engineers generally. There was exhibited by William F. Roberts an engine actuated by carbon dioxide used expansively upon the piston of the engine, the same as steam, with a proportionate reduction of a piston area for proportionate amount of power, as compared with steam.

The carbon dioxide was compressed into a liquid at a temperature of 108 degrees below zero, Fahrenheit. When released from the steel cylinder into a tube of small diameter, it expanded into a gas, which was conducted through a coiled tube to which heat was applied. The application of heat raised the pressure of the gas, which was then used in the engine the same as steam, entering the cylinder at 250 de-

grees F., and leaving it by the exhaust at 30 degrees F.

The explanation given by Mr. Roberts was that the carbon dioxide gas acted only as a medium of conducting the heat produced by the lamp, the power being represented by the heat units utilized in the engine, or the difference between 250 degrees and 30 degrees. This, he claimed, was an economical use of heat not approached by any other method, as by the use of coal and an ordinary steam engine, not over 5 per cent. of the heat units were utilized, and not to exceed 7 per cent. by the best compound engines. By this method he claimed that these figures were approximately reversed, and instead of losing 93 per cent. of the energy, 93 per cent. would be utilized by the use of the carbon dioxide apparatus.

This claim was so startling to the members of the Institute that a spirited cross-fire of questions and answers ensued, which brought out much additional information and some data as to the cost of operating the apparatus. The leading thought in the explanation was that a slight increase of heat made a great increase in gas pressure. For instance, the liquid at 108 degrees below zero had an expansive pressure of 263 pounds per square inch; at 5 degrees above zero the gas pressure was 354 pounds; at 32 degrees, 520.6 pounds; at 87.6 degrees, 1,161 pounds; at 114 degrees, 2,375 pounds; at 150 degrees, 3,000 pounds. As an illustration of economy, he said the cost of power to run a street car would be less than one cent per car mile.

We are not competent to discuss this question from a technical standpoint, to estimate the cost and economy of this source of power, but compared with the force developed by the change from water to steam, that given by the change of liquid carbon dioxide or liquid air to a gas is enormous. There are mechanical difficulties in the way of the application of these powers, but they can and will be overcome. Up to the present, however, it is necessary to use the power of steam in some way to accomplish the preliminary condensation of these gases to their liquid conditions, where their expansive force can be utilized. The cost of the power which effects this condensation must be considered.

Still, though the problem is a great and perplexing one, we are apparently on the eve of the discovery of a motive power destined to supersede steam; electricity has done so to a certain extent, but there is still needed some way of direct conversion of one form of energy into another.

Druggists' Liquor Licenses.

The liquor question is a great trouble to the drug trade, and all because there are some disreputable, conscienceless druggists who will not observe the laws. In order to control and punish these rascals the whole trade must suffer. A sample of the restrictions under which the druggist must act, and which put him in the position of a suspected criminal, is afforded by the action of the City Council of Colorado Springs, Col. Before them appeared a committee of prominent citizens and asked that two druggists lately found guilty of violating the city ordinance be refused licenses, and that the number of licenses issued to drug stores under the existing ordinances be one to every 3,000 inhabitants, and that the druggist hereafter found guilty of violating the law have his license cancelled and withheld from him for a period of one year. They commended the plan of granting licenses for six months only. They recommended incorporating into the druggists' license provisions that no person other than a physician, an officer of the law or an employee of the drug store be allowed behind the prescription

counters, and that no liquors be permitted in the windows and that the stores be open to inspection at all times without notice. One of the aldermen then presented a resolution which was adopted, providing that these regulations be presented to the druggists in connection with their licenses.

When such regulations as these are necessary, it is about time the reputable druggists give up handling liquors entirely. One's self-respect is to be preserved at all cost.

N. W. D. A. Wins in Tennessee.

It will be remembered that several members of the National Wholesale Druggists' Association resident in Tennessee were last year made defendants in a suit brought by an Ohio jobbing house which, because of its persistent violation of the rebate contract and its sales to cutters, had found it difficult to procure goods from other jobbers and manufacturers. The defendants were charged with constituting a trust, in violation of law. The case has excited no apprehension on the part of the defendants or the N. W. D. A. as a whole, and now it has been disposed of, probably permanently, Judge Anderson having granted a motion to quash the indictments. He delivered an elaborate and comprehensive opinion, citing the law for each position. The main ground for quashing the indictment, as cited in the opinion, was that it was vague and insufficient. The indictment charges that a combine for the sale of drugs was entered into by the defendants. This, Judge Anderson held, was not sufficient. The term drug was too broad. The indictment should have specified the kinds of drugs. He held, however, that the act of 1891 was constitutional.

Hydrogen Liquefied.

A few days ago there came a cable dispatch from London to the effect that Prof. Dewar has succeeded in liquefying hydrogen. The dispatch is meager in particulars, and we must wait for the details concerning the method and apparatus employed in the accomplishment of the feat. But the fact that it is done is sufficient to interest the whole scientific world. It is an achievement which will make Prof. Dewar's name familiar as a household word. Its importance and significance are great and far-reaching, and it is one of the most notable among the notable accomplishments of this period of intense scientific interest and activity. It has long been the cherished aim of the physicist, the chemist, to condense to liquid form the elusive, tenuous gas hydrogen, the element than which no lighter is known. Some have announced success in this direction, but none of these claims has been substantiated.

The progress made in the past few years in both directions, intense heat and intense cold, has been remarkable. Between the extremes of the electric furnace and artificial diamonds, on the one hand, and liquid hydrogen on the other, there lies material for a romance of fact, if the phrase be accepted, far exceeding in interest the highest and boldest fancy of the most imaginative writer of fiction. A liquid boiling several hundred degrees below zero rather upsets our ordinary conception that boiling means heat that burns. We are not accustomed to air which can be laded out by the dipperful as a quiet mobile fluid, one which, while actively boiling, will freeze a beefsteak or absolute alcohol. We have been accustomed to consider heat and cold and boiling and freezing as absolute, rather than relative terms, and our prejudices and cherished delusions have been rudely shocked by these scientists.

The liquefaction or solidification by the combination of cold and pressure of elements (hitherto believed

to be not susceptible to such changes has done much to assist the chemist in the verification of his theories, but has at the same time shown him that many properties heretofore considered inherent attributes of these elements are characteristics of condition only. The chemical activities and affinities and the physical properties of elements and compounds are changed to a marvelous degree in passing from the gaseous to the liquid state. It has been believed that if hydrogen could only be liquefied, many problems would be rendered easy of solution, many an obscure question be cleared up. Liquid hydrogen is now a fact.

Prof. Dewar has produced half a wineglassful of liquid hydrogen in five minutes, and reports that the process is applicable to any quantity. Mr. Tripler, the liquid air manufacturer, will show us how to make it by the gallon or milkcanful.

But the interesting feature of Dewar's achievement is that liquid hydrogen boils at 240 degrees below Centigrade, or, in other words, it must be liquefied at or below that temperature. The theoretical absolute Zero of the scientist has been put at — 273 degrees C. Either Dewar is pretty close to it, or absolute zero must be put down a few more degrees.

Another fact, which, standing alone, would be of immense interest, but which in this connection sinks into comparative insignificance, is that by the use of liquid hydrogen, Prof. Dewar has also liquefied helium, the element discovered two or three years ago.

"The Drug Store War Called Off" and "The Drug Store War On Again" are newspaper headings which, under dates of but three days apart, show the state of affairs prevailing among the druggists of Birmingham, Ala. In that city a cut-rate store started business, the druggists undercut and ran it out, a truce was signed, agreement not to cut any more ratified, agreement almost immediately violated by original offender, cutting worse than ever, and there you are. Public satisfied. No chance for restoration of prices.

The American drug store must be a considerable cause of wonderment to pharmacists of the old world, who are accustomed to much of "profession" and little of "trade." We are great on side lines here. For instance, burglars who recently ransacked a Missouri drug store, carried away finger rings, knives, razors, spectacles, cuff buttons, watch chains, pipes, cigars, etc. They seem to have disregarded the drugs entirely, but knew that the drug store was the place for the other things.

A drunken man entered a Grand Rapids, Mich., drug store, bought thirty grains of morphine, swallowed it, died. Coroner says: "I would like to know why it was that an intoxicated man should have been sold a large quantity of morphine." It is likely to go hard with the druggist.

PRODUCTION OF MILK SUGAR.—The increased uses of milk sugar and consequent multiplication of dairies and factories have brought the production to figures not imagined a few years ago, and the price has fallen to an extraordinarily low point. The greatest producer at present is North America, which some years ago manufactured 40 per cent. in excess of its own consumption. The American plants are now sufficiently extended to enable them to supply the whole world. This industry, which began in Switzerland and was in a highly flourishing condition in Germany up till a few years ago, was founded in the United States in consequence of the tariff, which in 1890 placed a duty of 8 cents a pound on foreign milk sugar. Before this time, America derived its entire supply from Germany. Notwithstanding the high duty, a small quantity is still sent from there. (Ap. Ztg.).

HANDLING OF PILLS, TABLETS AND TRITURATES.*

BY LEON L. WATTERS.

A few years ago it might have been said that a druggist's ability to form a good and presentable pill was a safe criterion by which to judge of his fitness. There was hardly a pharmacist but that prided himself upon the possession of some special knack by means of which he was enabled to turn out a particularly handsome pill from a prescription which in the hands of a competitor resulted in naught but unsightly masses.

That was in the days when the now incongruous title of "pill-roller" was truly merited; it well described an important phase of the business of the average apothecary. The era of hand-made pills seems to be rapidly drawing to a close; and with the advent of the machine-made article, there seems to have come over druggists a tendency to rely too closely upon the manufacturer's label as a guarantee of reliability. Many labels are perfectly reliable, but some not. The natural result has been that druggists have in some cases unintentionally become the distributors of pills grossly inaccurate in composition, and, so far as medicinal virtue is concerned, at times totally inert. Again, it would seem that just as the druggist's share in the manufacture of these preparations has become less and less, so correspondingly has his interest in the proper care of the finished products decreased; and, indeed, the opinion prevails among many that pills and tablets require no attention from them. By figuring up the loss occasioned in a year by bad pills and the consequent loss of customers, it becomes evident that the trifling attention required to properly care for preparations so widely used is well repaid.

The one thing demanded of any pharmaceutical preparation, be it pill, powder or tincture, is that it shall produce its desired medicinal effect. All other conditions of appearance, convenience and cost are but secondary. However handsome a pill may appear, what druggist would not instantly reject it in favor of the modest, cinnamon-covered product if it were found that it would pass through the system unaltered? Just so will physicians prefer the bitter quinine sulphate to the more palatable mixture of its tannate with chocolate, if the latter should prove to be insoluble in the digestive fluids.

A druggist can only be absolutely sure of the quality and composition of pills and other such drugs as he himself makes or has analyzed; but the condition of pharmacy is such to-day that it is practically impossible for any one to manufacture for his own use all classes of compounds demanded. Especially is this the case with pills and tablets, where the continued improvement in the methods of manufacture has rendered it possible to make them by machinery of a quality and cheapness utterly unattainable by the retail druggist. It would seem, then, that the one wise precaution to be taken with regard to all such preparations, is to buy only from reputable dealers. The difference in cost between a good pill and a poor one is too slight to warrant taking chances on the cheaper. Next to reliability, there are yet such factors to influence a choice as appearance, coating and permanence. As a rule, avoid pills are preferred to round ones, and those without needle holes to such as are made by the old process, as the former do not present an open surface to the harmful action of air and moisture. The choice between sugar and gelatin-coated pills is largely a matter of individual preference.

Unless a druggist makes his own tablets and tablet-triturates, his only guarantee of good quality lies in buying from manufacturers of unquestionable reliability; for, unfortunately, druggists have neither the time nor the apparatus for their proper analysis.

Some pills have an annoying way of becoming sticky, and even fusing together at but little above ordinary temperature, as a result of not having been thoroughly dried. In such cases dislodge them by a few smart raps on the sides of the container, spread them out on a sheet of clean paper, and allow them to dry. When dry they should be separated as well as possible, and all

broken or imperfect ones discarded. The remainder should then be dusted over with lycopodium, rolled to and fro until the powder ceases to adhere to them; freed from lycopodium by a coarse sieve, rubbed between the layers of a clean dry towel, and preserved in dry bottles with well-fitting stoppers. Such a procedure requires but a short time—a thousand pills can be treated in a few minutes, and the saving of otherwise ruined pills is well worth the trouble. It is a good plan to treat all pills bought in large quantities in this way as soon as received.

Pills are best stored in a cool, dry place, shielded from the direct rays of the sun; for many pills contain substances easily oxidized. In the case of pills seldom used, it is well to seal over the stoppers of the containers with a little melted beeswax or paraffin. The first essential in preserving tablets and tablet triturates is to exclude moisture and moist air. This is best accomplished by storing them in well filled bottles, plugged at the neck with a bit of cotton and fitted with tight stoppers. Tablets containing mercury salts are easily reduced to the metallic state, and should be preserved in amber-colored bottles.

The fact that the pills of different makers are seldom uniform in appearance, often lends to much unnecessary confusion in refilled prescriptions. Sick people are often annoyingly discriminating, and the discovery that gelatin-coated pills have been used in filling a prescription, when sugar-coated were first supplied, arouses in their minds a grave suspicion that something is wrong. It is much the same with hand-made pills, and there is hardly a druggist but who has had the experience of a customer returning in alarm because lycopodium instead of cinnamon, as when first filled, has been employed as a dusting powder. It is well worth while to take the precaution of specifying on each prescription the kind of pill or dusting powder employed, as "g. c." and "s. c." for gelatin and sugar-coated pills respectively, or "cum lycopod." or "cum cinnamon," according to the powder used, in order that on refilling they will look and taste alike. It is a popular fallacy that it is necessary to half fill a box containing hand-made pills with the dusting powder used, but if the mass has been properly formed there is little danger of their sticking together after being lightly dusted over with lycopodium. It is far neater to arrange the finished pills upon a thin layer of pure white or tinted cotton laid flat in the bottom of the box, and then covering over with a similar layer, neatly trimmed to fit the box. Tablets should always be placed in cotton to prevent them from breaking.

SAR is the name adopted by the United States Department of Agriculture for a new fungicide solution used in the treatment for the prevention of oat and other grain smuts. The name is coined from the first letter in each of the words, sulphur, alkali and resin, the solution being made from these substances, as follows: Place 15 pounds of flowers of sulphur in a barrel, mix thoroughly with it one half-pound of finely powdered resin, and stir well with 3 quarts of water, which should make a thick paste. The paste must not be thin and watery, nor so dry as to crumble to powder when stirred. Then add ten pounds of caustic soda (granulated lye will serve admirably), and stir well. After from three to fifteen minutes the mass turns a reddish-brown and boils violently, and must be stirred well, preferably with a broad paddle, to prevent it from running over. After it has ceased boiling, add slowly about two gallons of hot water, (hot if possible, but cold will do), and then carefully pour off into another vessel marked to hold six gallons, and add hot water till the six gallon mark is reached. This gives a stock solution, which must be kept in tightly corked jugs or in closed barrels or kegs, since it spoils if it comes in contact with the air. It is also decomposed if it touches metals. Of this stock solution use one and a half pints to fifty gallons of water, soaking the seed or grain twenty-four hours, or one gallon to fifty, soaking two hours. This treatment is much cheaper than that of the usual potassium sulphide method, the mixture is more convenient to keep and use, and is claimed to have proved equally as effective.

*Mercer's Report.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblentz, A.M., Ph. M., Ph.D., F.C.S.	Oscar Oldberg, Phar.D.
Wilbur G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Phm. B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M. D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college; and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 27, 1898; the second term began February 17, 1898, and will end June 30, 1898. The junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum, and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 71.

Inorganic Chemistry.

MANGANESE.

Symbol, Mn. Valence, 2, 3 and 7. Atomic Weight, 55. Specific Gravity, 7.2.

Manganese constitutes the primary subdivision of the seventh group of the periodic system, the other subdivision of which includes the chlorin family. No other element belonging to the same subdivision has yet been discovered.

In its lowest oxid and the corresponding manganous salts the element resembles calcium, magnesium and zinc. In its highest oxid and the corresponding permanganates it behaves like the members of the chlorin family in the perchlorates and periodates, while through the compounds intermediate to the highest and lowest oxids it is allied to the corresponding compounds of iron, chromium, lead, nickel and cobalt.

Historical.—The most common ore of manganese, the dioxid, was confounded by the ancients with the magnetic oxid of iron, which it resembles in appearance. The distinction between the two minerals was shown by Pott in 1740, who prepared some of the salts of manganese. The subject was again studied by Scheele in 1774, and, based upon his experiments, Bergman suggested that the dioxid probably contained a new metal. The element was also obtained in the free state in the same year by Cahn. The name is doubtless from "magnes," the Latin word for the natural magnet or loadstone with which its oxid was at first confused.

Natural Occurrence.—The principal natural compound of manganese is the dioxid, or pyrolusite. It is also found as the sesquioxid, the manganous-manganic oxid, as the carbonate, and very frequently as a minor constituent of other minerals. By the disintegration of the rocks containing it, manganous compounds find their way into the soil, and thence into the tissues of plants and animals.

Preparation.—The element can be obtained in the free state by heating an intimate mixture of charcoal and an oxid of manganese to a white heat, some flux-forming material being also present. As obtained in this manner the metal always contains iron, silicon, sulfur, and other impurities. It can be obtained in a purer state by decomposing its chlorid by heating with metallic sodium, or by electrolysis.

Description and Physical Properties.—Manganese is a white or reddish-white metal, on unoxidized surfaces closely resembling cast iron in appearance. It is hard, crystal-

line and brittle, possessing but little malleability or ductility. Its specific gravity is 7.2, and its melting point above that of iron.

Chemical Properties.—The metal oxidizes readily in the air, decomposes water, and is easily dissolved by dilute acids. Owing to its ready oxidation it must be preserved under naphtha.

Uses.—The pure metal has no practical application. An alloy of manganese and iron, known as ferromanganese, or spiegeleisen, is employed in the manufacture of steel by the Bessemer process.

COMPOUNDS.

Oxygen Compounds.—The important oxygen compounds of manganese are manganous oxid, manganic oxid, manganous-manganic oxid, the dioxid or peroxid, and the heptoxid, or permanganic anhydrid.

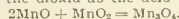
Manganous oxid, MnO, is a grayish green powder produced by reduction of the higher oxids. It readily absorbs oxygen, changing to manganous-manganic oxid. Manganous hydroxid, Mn(OH)₂, is produced by precipitating the manganous salts with an alkali, but, like the oxid, it is instable, absorbing oxygen and forming manganous-manganic oxid. Manganous oxid and hydroxid are basic in character, and the corresponding compounds, the manganous salts, are quite stable.

Manganic oxid, or sesquioxid, Mn₂O₃, is a brown powder which occurs in nature as the mineral braunite or may be prepared by heating the other oxids in a current of hydrogen. Normal manganic hydroxid, Mn(OH)₃, cannot be produced by precipitating manganic salts by means of an alkali, but can be prepared by carefully oxidizing manganous hydroxid covered with ammonium hydroxid.

Manganic oxid and hydroxid are feebly basic, and the manganic salts are therefore less stable in character than the manganous salts.

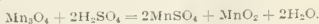
Manganous-manganic oxid, or trimanganic tetroxid, Mn₃O₄, occurs naturally as a brown-black mineral known as hausmannite, and can be prepared artificially by heating the other oxids of manganese in a current of air or oxygen.

It is esteemed to be a compound of the monoxid and dioxid, or as a salt of manganic acid, the monoxid acting as the base and the dioxid as the acid radical.

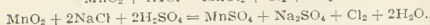
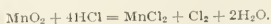


This view of its composition is strengthened by the

fact that when it is treated with nitric or sulfuric acid, a manganous salt is formed, and the dioxide left behind.

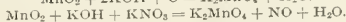
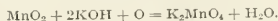


Manganese dioxide, or peroxide, MnO_2 , occurs naturally as the mineral pyrolusite, a heavy, black, or steel gray, crystalline substance with a metallic luster. It is the most important ore of manganese, and large quantities of it are employed in the arts and as the source of the other compounds of manganese. Much of its importance arises from the facility with which it acts as an oxidizing agent, as in the production of chlorine from hydrochloric acid, or from a mixture of common salt and sulfuric acid. It is employed in this way in immense quantities in the manufacture of bleaching powder,—



Theoretically manganese dioxide is the anhydride of metamanganous acid, H_2MnO_3 . The only known manganates, however, are salts of polymanganous acids, as $\text{K}_2\text{Mn}_2\text{O}_7$, CaMn_2O_6 , etc.

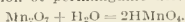
By fusing manganese dioxide with an alkali, in the air or in presence of an oxidizing agent, oxygen is taken up, and an alkaline manganate produced.



The corresponding manganic acid, H_2MnO_4 , and its anhydride, Mn_2O_7 , are not known in the free state.

The alkaline manganates dissolve in water to form green solutions which gradually change to purple red solutions by absorption of oxygen, or the change takes place immediately in the presence of free acid. The color change is due to the formation of purple permanganate, and gave rise to the old name of "chameleon mineral" which was applied to the potassium salt.

Manganese heptoxide, or permanganic anhydride, Mn_2O_7 , is the anhydride of permanganic acid, H_2MnO_4 , and is a dark green or nearly black, oily liquid prepared by adding solid potassium permanganate to concentrated sulfuric acid, the mixture being refrigerated during the reaction. It is a powerful oxidizing agent, setting fire to organic substances, as paper and alcohol, and decomposing explosively when heated. Dissolved in water it forms a purple-red solution of permanganic acid, HMnO_4 .



The principal salt of the latter acid is the potassium permanganate of the Pharmacopoeia, useful as a disinfectant, bleaching agent, and as a reagent, because of its oxidizing power. The liquid known as Condy's Disinfecting Liquid is an impure solution of potassium permanganate.

Halogen Compounds.—The two most important halogen compounds of manganese are the manganous and manganic chlorides.

Manganous chloride, MnCl_2 , can be obtained in solution by dissolving the oxide or hydroxide in hydrochloric acid. On careful evaporation it can be obtained in pink crystals containing four molecules of water, $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$.

Manganic chloride, MnCl_3 , can be obtained in the form of a dark brown solution by dissolving manganic hydroxide in cold hydrochloric acid. It is unstable, and on heating or standing decomposes into manganous chloride and free chlorine. Similar bromides, iodides and fluorides are also known.

Salts of the Oxygen Acids.—The most important salts of the oxygen acids are the sulfates.

Manganous sulfate can be prepared by dissolving manganous oxide or carbonate in sulfuric acid, and evaporating the solution. It forms pinkish white crystals containing seven molecules of water, and is isomorphous with other vitriols, as zinc sulfate. The amount of water of crystallization taken up varies with the temperature at which the evaporation is conducted.

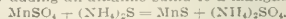
Manganic sulfate, $\text{Mn}_2(\text{SO}_4)_3$, can be prepared as a dark green powder, by heating finely powdered manganese dioxide with concentrated sulfuric acid,—



Like the other sulfates of trivalent metals which we have studied, manganic sulfate can combine with the sul-

fates of the alkali metals to form alums. Potassium manganic alum, $\text{K}_2\text{Mn}_2(\text{SO}_4)_4 \cdot 24\text{H}_2\text{O}$, and ammonium manganic alum, $(\text{NH}_4)_2\text{Mn}_2(\text{SO}_4)_4 \cdot 24\text{H}_2\text{O}$, are examples.

Sulfur Compounds.—Manganous sulfide, MnS , occurs in nature as manganese blende, and can be produced artificially by adding an alkaline sulfide to a manganous salt,—



Obtained in this way it forms a pinkish or flesh-colored precipitate, soluble in acids, and in the presence of air gradually darkens through absorption of oxygen.

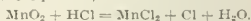
Characteristic Reactions.—Manganese compounds of all degrees of oxidation color the borax bead, when heated in the outer flame, violet when hot, amethyst red when cold. Manganous salts with alkaline sulfides yield a flesh-colored precipitate of manganous sulfide. Manganates and permanganates are known by their intense colors and color changes. Other compounds when heated with potassium nitrate and carbonate yield a green mass of manganate, dissolving in water to form the purple permanganate. Manganous salts, as the sulfate or hydroxide, when heated with lead dioxide and dilute sulfuric acid or nitric acid yield a purple solution of permanganic acid.

PRACTICAL STUDIES.

1.—Prepare a borax bead in the usual manner and when clear saturate with a manganese compound, and heat in the outer blow-pipe flame. Note the color both hot and cold.

2.—Add some hydrochloric acid to the black oxide of manganese, contained in a flask or test tube, mix thoroughly by agitation and heat the mixture in a fume closet, or where the fumes can be carried out of doors by a draught. What is the gas produced?

Balance the equation,—



3.—To a solution of manganous sulfate add solution of potassium or sodium hydroxide. What is the precipitate produced? Divide the precipitate into two portions.

4.—Mix one portion of the precipitate with dry powdered potassium carbonate and nitrate, place on a piece of platinum foil and heat in the outer blow-pipe flame. What change occurs?

5.—Dissolve a portion of the mass obtained by the last experiment in water, and add a few drops of sulfuric acid. What takes place?

6.—Place the other portion of the precipitate obtained in experiment 4 in a test tube, add about an equal bulk lead dioxide, and of red lead, cover with water, add a few drops of nitric or sulfuric acid, and heat the mixture. If the experiment is successful a beautiful purple liquid is produced. To what is the color due?

7.—To some solution of manganous sulfate add solution of ammonium sulfide. What is the color and probable composition of the precipitate produced?

ANNOUNCEMENT TO ERA STUDENTS.

THE SPECIAL ATTENTION OF ALL STUDENTS OF THE ERA COURSE IS DIRECTED TO THE CIRCULAR RELATING TO PRIZES WHICH WILL ACCOMPANY THE NEW LIST OF RECITATION PAPERS.

J. H. BEAL,

Director of the Era Course in Pharmacy.

LARGIN is a new silver—albumin compound, which in the air-dried condition contains 11.1 per cent. of silver. The albumin component is a new decomposition product of a para-nucleo-proteid, whose most prominent characteristic is solubility in dilute alcohol. Experiments on gonococci showed these to be destroyed in greater part within 5 minutes by a 1:4000 solution of largin. (Ap. Ztg.)

LYE FOR WASHING AND BLEACHING LINEN.—Water 600 parts, caustic soda 150 parts, rosin 75 parts, white soap 50 parts, alum 50 parts, sodium carbonate 200 parts, potassium or sodium silicate 200 parts. Dissolve 150 parts of the silicate in 600 parts of water, add the rosin and after solution the remainder. (Ap. Ztg.)

LECTURE No. 72.

Pharmaceutical Processes.

Specific Gravity and Specific Volume.

Definition and General Statement—For commercial uses it is ordinarily sufficient to know the weight of a body without regard to its volume or to know its volume without regard to its weight, but for many of the purposes of scientific pharmacy it is necessary to know its weight or volume as compared with the weight or volume of a standard substance.

It is readily noticed, for example, that bodies of equal size, but of different materials, as equal cubes of wood, marble and lead, may have widely different weights. This fact is expressed by the statement that they differ in *density*, that is, that the heavier bodies contain a greater quantity of matter within a given volume than the lighter or less dense bodies.

The density of a substance is a constant, or tolerably constant, characteristic, and hence is frequently of importance as a means of determining its identity or purity. What is sought, however, is not its absolute but its *relative density*, or the ratio of its density to the density of the body which has been selected as the standard. The number which expresses this relation is variously known as the relative weight, specific weight, specific density, or specific gravity, the term first given perhaps more nearly expressing what is intended.

When it is said that the specific gravity of mercury is 13.5 and of alcohol 0.82, what is meant is that the mercury is 13.5 times heavier and alcohol 0.82 times as heavy as an equal volume of the standard. If a given volume of the standard weighs 100 grams, then an equal volume of mercury will weigh 1350 grams, and an equal volume of alcohol 82 grams.

From the foregoing statements may be derived the following definition: The *Specific Weight or Specific Gravity* of a substance is the ratio of its density to the density of a standard, or it is the weight of a body compared with the weight of an equal volume of a standard.

For general scientific purposes distilled water at its maximum density, 4° C., is the standard for liquids and solids. The standard of the Pharmacopoeia is distilled water at 15° C.,—this being a temperature readily obtained—except for alcoholic liquors which are to be determined at 16° C., to correspond with the Federal Revenue Service which makes use of this temperature in its determinations. The standard generally used for gases is air at the temperature of 0° C., and a barometric pressure of 760 millimetres.

Processes Involved in Determining Specific Gravity.—The determination of the specific gravity of a substance involves two distinct processes as follows:

(1) A Process of Manipulation, having for its object to determine,

(a) The weight and volume of the body.

(b) The weight of an equal volume of the standard.

(2) An Arithmetical process or the calculation of the ratio. Since a ratio is merely an indicated division, we have the common rule, "Divide the weight of the body by the weight of an equal volume of the standard." The quotient is the specific gravity.

Methods of Finding the Weight and Volume of the Body and the Weight of an Equal Volume of the Standard.—The weight of the body is directly determined by means of the balance. If the body is a liquid or a gas, its volume is found by measuring with the usual graduated vessels. The vast majority of solids, however, are so irregular in form that a direct measurement of their volume is impossible or impracticable, and in such cases some indirect method must be resorted to. It is not necessary to separately determine the weight of an equal volume of the standard, since if the volume of the body is known in cubic centimeters the weight of an equal volume of the standard is also known, as the weight of a cubic centimeter of water is one gram.

The volume of an irregular solid may be found in a number of different ways, but we shall consider only the more useful and common methods.

(1) **From the Volume of Water Displaced.**—For this method

there is necessary a graduated cylinder or graduated tube of small diameter. A burette will answer. Water is poured into the tube or cylinder to a certain mark, which is noted. The body whose volume is desired, having been first weighed, is then dropped in and the rise of water in the tube observed. It is evident that the immersed solid displaces its own volume of the liquid. If, for example, the water stood at the 25 Cc. mark before adding the solid and afterwards at the 30 Cc. mark, then the volume of the solid is 5 Cc., the amount of water displaced. The weight of the 5 Cc. of water is known to be 5 Gm., and if the weight of the solid is, for example, 22.5 Gm., its specific gravity is $22.5 : 5$, or 22.5 divided by 5 = 4.5, or the ratio of the weight of the solid to the weight of an equal volume of water.

If the solid is one which is lighter than water, as wood or cork, it is immersed by attaching a sinker, as a piece of lead, and noting the volume displaced by both. The sinker is then immersed alone, and the amount which it displaces subtracted from the first displacement. If both displace 8 Cc., and the sinker alone 2 Cc., the volume of the body is equal to the difference, or 6 Cc., and the weight of the water displaced by the cork alone is 6 Gm. If the weight of the cork was 1.44 Gm., its specific gravity will be $1.44 : 6$, or 1.44 divided by 6 = 0.240.

(2) **From the Loss of Weight in Water.**—This method of determining the volume of an irregular solid depends upon the principle, whose discovery is attributed to Archimedes, that when a body is immersed in a liquid, the loss of weight is equal to the weight of the liquid displaced, which is, of course, equal in volume to the volume of the solid which displaces it. If, then, a body is weighed first in air and afterward in water and the loss in weight noted, the data are obtained for calculating the specific gravity. (Fig. 18.) For example, a piece of lead weighs in air 45.4 Gm. and in water 41.4 Gm. It has lost 4 Gm. in weight, and by the law of Archimedes has displaced 4 Gm. of water and is therefore 4 cubic centimeters in volume, since one gram of water equals one cubic centimeter. Its specific gravity is therefore 45.4 divided by 4 , or its weight divided by the loss of weight in water = 11.35.

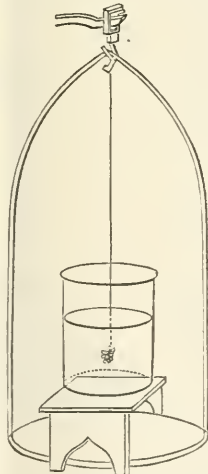


Fig. 18.—Weighing a Solid in a Liquid.

If the body is lighter than water, use is made of a sinker whose loss in weight when immersed in water has been determined by a separate experiment. From the loss in weight of both sinker and object is subtracted the loss due to the sinker alone, the remainder being the weight in grams and the volume in cubic centimeters of the water which is displaced by the object. For example, a sinker and a piece of wood lose together 12 Gm., and the sinker has been shown to displace 4 Gm. when immersed alone. The wood therefore displaces 8 Gm., and if its weight in air is, say 5.2 Gm., its specific gravity is 5.2 divided by 8 = 0.650.

To Find the Volume and Weight of Water Displaced by a Powder.—For this purpose there is necessary a vessel whose weight and capacity are known, usually a specific gravity bottle. A portion of the powder is introduced and the whole weighed, and the weight of the bottle subtracted to give the weight of the powder. Water is added and

the bottle shaken until the powder is thoroughly wet, when the bottle is filled to the mark and weighed. Subtracting the weight of the bottle gives the weight of the water and solid. Subtracting from this the previously determined weight of the powder, the remainder represents the weight of the water now in the bottle. The difference between this last quantity and the capacity of the bottle is the space occupied by the powder. The usual calculation will give the specific gravity.

An example will make the procedure plain. Let the bottle be presumed to hold 10 Cc. and to weigh 15.225 Gm.

The bottle and dry powder weighed together,	15.725 Gm.
Subtracting the weight of the bottle,	15.225 Gm.
The weight of the powder taken is	0.500 Gm.

The bottle, powder and water weighed together	25.475 Gm.
Subtracting the weight of the bottle,	15.225 Gm.

The weight of the powder and water is	10.250 Gm.
---------------------------------------	------------

Subtracting from this the weight of the powder	0.500 Gm.
The weight of the water is	9.750 Gm.

The powder has therefore displaced 0.250 Gm. or 0.250 Cc. of water, and its specific gravity is 0.500 divided by 0.250 = 2.000.

When the Substance is Soluble in Water.—It frequently occurs that the solid whose specific gravity is to be determined is soluble in water. In such case the manipulatory process is carried out exactly as in the several cases already considered, except that the liquid employed is one in which the solid is insoluble, as alcohol, ether, benzin, turpentine, a fixed oil, or any other liquid whose specific gravity is known or can readily be determined. The result which is arrived at by each manipulation is the weight of a volume of the liquid equal to the volume of the solid. The calculation is made in two steps:

1st.—Treat the liquid as if it were the standard and find the value of the ratio in the usual manner. The result is the specific gravity compared with the particular liquid used.

2nd.—Multiply the specific gravity thus obtained by the specific gravity of the liquid employed. The product is the true specific gravity of the solid, or the specific gravity compared with water.

SPECIFIC GRAVITY OF LIQUIDS.

Owing to the readiness with which the volumes of liquids may be exactly measured, the determination of their specific gravities is accomplished with less manipulation than in the case of solids. The most useful methods are with the Specific Gravity Bottle, by the Loss in Weight of an Immersed Solid, by Comparing Balanced Columns of the Liquid and of Water, or by means of some form of the Hydrometer.

With the Specific Gravity Bottle.—The method with the Specific Gravity Bottle, or *Pycnometer* as it is sometimes called, is the most accurate, and is always employed where great exactness is desired. The Specific Gravity Bottle (Fig. 19) is a small bulb of thin glass with a slender neck and holding, when filled to the top of the capillary orifice in the stopper, any convenient number, say 10 Cc. of water. The bottle being filled with the liquid under consideration and weighed at the proper temperature, the specific gravity of the liquid is found merely by moving the decimal point to the left so as to show the weight of one cubic centimeter, since in the metric system of weights and measures, the weight in grams of a cubic centimeter



Fig. 19.—Specific Gravity Bottle.

of a substance is equal to its specific gravity. If, for example, the bottle is found to contain when filled 8.200 Gm. of alcohol, then one cubic centimeter weighs 0.820 Gm. and this is its specific gravity. If it will contain 14.2 Gm. of nitric acid, then 1.42 Gm. is the weight of one Cc. of the acid, and its specific gravity is 1.42. Any other bottle may be used instead of one holding exactly 10 Cc. or 100 Cc., but in such cases the weight of the liquid which the bottle holds must be divided by the weight of water which it will hold, while in the former case the division is accomplished merely by removing the decimal point the required number of places to the left.

By the Loss in Weight of a Body Immersed in the Liquid.—This method is sometimes known as Gannal's Method. A body of convenient size, say a small glass stopper, is attached to a balance beam by means of a horsehair or a fine silk thread and weighed, first in air and afterwards in water. The loss, which is the weight of the water displaced, is noted, and the stopper is then weighed in the liquid whose specific gravity is required. The loss in the last case is the weight of an equal volume of the liquid. Dividing this by the loss of weight in water gives the specific gravity. If the stopper lose 21.6 Gm. in the liquid under consideration and 12 Gm. in water, the weights of equal

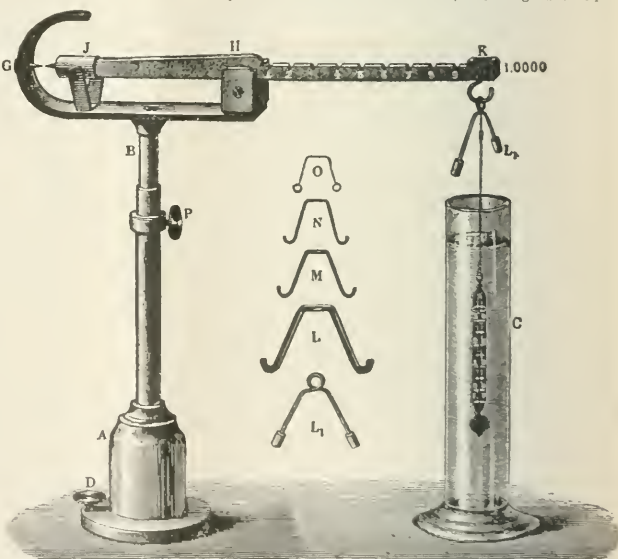


Fig. 20.—Westphal Specific Gravity Balance.

volumes are as 21.6 to 12, or 21.6 divided by 12 = 1.8.

If instead of the glass stopper a body is used which displaces exactly 10 Cc. or 100 Cc., its loss in water is known without trial and the first weighing may be dispensed with. The loss of weight in the liquid gives the specific gravity at once by removing the decimal point far enough to the left to show the weight of one cubic centimeter.

An ingenious application of this method is seen in the Mohr or Westphal Specific Gravity Balance. (Fig. 20.) This is a balance of special construction, provided with a graduated beam, a small thermometer to be immersed in the liquid to be examined, and a set of five weights. When no weights are attached, the beam just balances the thermometer. When the latter is immersed in water the equilibrium is destroyed, and can be restored by attaching the counterpoise to the hook. The counterpoise thus has a value of 1.000, since this is the specific gravity of water. If now the thermometer is immersed in a heavier liquid it will be necessary to add other weights to restore equilibrium. When

this is accomplished the specific gravity is read from the weights on the beam, beginning with the counterpoise, and reading from the largest to the smallest weights. When any one of the weights of the set is not employed

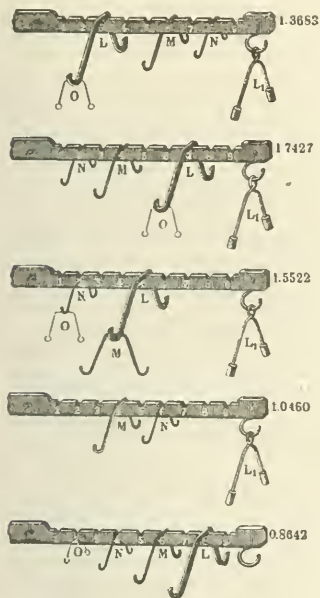


Fig. 21.—Reading Specific Gravity on Westphal Balance.

its place in the specific gravity is represented by a cipher. An examination of the illustration (Fig. 21.), showing the beam when representing different specific gravities, will make this method clear.

Specific Gravity by Balanced Columns of Liquids.—In this method of taking the specific gravity the height of a column of the liquid considered is compared with a similar column of water, both being sustained by atmospheric pressure. Their heights will be inversely as their specific gravities.

Two slender graduated tubes, connected at the top with a U tube which is closed with a stopcock, are inserted one in the liquid and the other in water, and suction applied. When the tubes have been sufficiently filled the stopcock is closed and the heights of the respective liquid columns noted. The columns will have different heights, but will have the same weights, since they are maintained by an equal atmospheric pressure. It follows that the product of the height of one of the columns by its specific gravity will be equal to the product of the other column by its specific gravity.

Since the specific gravity of water is one, the product of the water column will be equal to its height, and the specific gravity of the other liquid will be equal to the height of the water column divided by the height of the liquid under consideration. If the water column be 18.2 cm high and the other 10 cm, the specific gravity = $18.2 \div 10 = 1.82$.

This method is not very exact, and is but little used.

Specific Gravity by the Hydrometer.—A hydrometer is an instrument of glass, occasionally of metal, usually in the shape of a tube with one or more expansions near the lower end, and weighted at the bottom with mercury or shot so as to float upright when placed in a liquid.

The stem contains or is marked with a scale which indicates the specific gravity of the liquids by the depth

to which it sinks. The scale may be either an arbitrary one, or it may indicate the true specific gravity. An instrument of the latter kind is to be preferred, as hydrometers graduated according to an arbitrary scale, as Baume's, require the use of a table, or a special calculation to obtain the true specific gravity. Hydrometers are commonly made in sets of two, one for liquids heavier and one for liquids lighter than water. The 1,000 mark will be at the top of the stem of an instrument intended for liquids heavier than water, and at the bottom of one for liquids lighter than water. (Fig. 22.)

Owing to difficulties of exact graduation, and of observing accurately the precise displacement of liquid, all hydrometers give results which are only approximately correct. Exactness is approached in proportion as the stem is narrow and ranges through considerable distances for small differences in the density of the liquids for which it is employed. For this reason it is usual to have instruments specially adapted for certain classes of liquids. Special hydrometers are named according to the use for which they are intended. A urinometer is an instrument for taking the density of urine, and alcoholometer for alcohol, a lactometer for milk, a saccharometer for sugar solutions, etc.

In these instruments a considerable length of stem corresponds to only a small difference of density. In this way errors of observation are reduced to a minimum and results are reached which are much nearer the truth than can be obtained with instruments intended for a variety of liquids.

To make use of a hydrometer it is floated in the liquid contained in a tall glass cylinder known as a hydrometer jar. The point at which the hydrometer is intended to be read should be known, as some makers graduate their instruments to be read at the top of the mark to which the liquid rises on the stem at the general level of the liquid. The latter is manifestly the correct method, since the height to which the liquid rises on the stem will vary with its attraction for the material of the instrument. The temperature at which the instrument is intended to be used should also be known.

Hydrometers should be tested before using, and their errors, if any, noted for the correction of subsequent readings. Since the degree of submergence is not exactly proportional to the density of the liquid, it follows that the distances between the marks will be smaller near the bottom than at the top. Consequently if the marks are all of the same distance apart, the instrument can not be correct.

Lövi's Beads.—These are small, hollow globes or beads of glass, each one being marked with the specific gravity to which it corresponds. If a number of these be thrown into a liquid, the lighter ones will float upon the surface, the heavier ones will fall to the bottom, while those which correspond exactly to the specific gravity of the liquid will float indifferently at any point beneath the surface. In effect, Lövi's beads are hydrometers, each one corresponding to a single specific gravity.

SPECIFIC GRAVITY OF GASES.

Pharmacists rarely, if ever, have occasion to determine the specific gravity of gases, and the subject is mentioned here merely by way of reference.

Two standards are employed for gases, air and hydrogen, both at the temperature of 0° C. when the barometric pressure is 760 millimeters. It would probably be best to adopt hydrogen exclusively for this purpose, since it is already the standard for the measurement of atomic weight and valence. It is also to be preferred for the reason that the specific gravities of elementary gases referred to hydrogen are equal to their atomic weights, thus the specific gravity of Chlorin is 35.4 which is also its atomic weight, and so on.

To take the specific gravity of a gas, stout glass globes

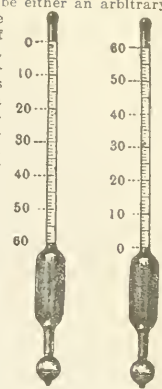


Fig. 22.—Hydrometers for Liquids Lighter and Heavier than Water.

whose weights are accurately known are first weighed when filled with the standard, and afterwards when filled with the gas under consideration, care being taken that the standard has been thoroughly replaced with the gas whose specific gravity is desired. When the weights are known the specific gravity is calculated as with liquids and solids, by dividing the weight of the gas by the weight of the standard. Such experiments are understood to be performed in a vacuum or the necessary allowance made for the buoyant force of the atmosphere, which would amount to about 1.293 Gm. on a vessel of the volume of one liter.

The volumes of gases being greatly affected by slight changes in temperature and pressure it is important to take their volumes at standard conditions or to make the necessary corrections for any variations from these conditions. Fortunately these variations proceed according to uniform laws and the corrections are easily made.

SPECIFIC VOLUME.

It is instructive and sometimes of importance to compare the volumes of substances as well as their weights. In the determination of specific gravity equal volumes are taken and their weights compared, in specific volume equal weights are taken and their volumes compared. Specific Volume may therefore be defined as the volume of a substance compared with the volume of an equal weight of a standard substance.

Specific volume may be determined either by experiment or by calculation from the specific gravity. To determine the Specific Volume of liquids by experiment there is needed a specific volume bottle. This is a small, thin, globe-shaped flask, with a long and slender neck. The neck is graduated, and the volume of the bottle so adjusted that a given weight of water, say 100 Gm., just comes to a certain point which is marked 1. or 1,000, the graduation being continued up and down the neck in cubic centimeters. The proper weight of the liquid having been introduced, the point to which it rises is noted and the specific volume determined by dividing the observed volume by the volume of an equal weight of water.

Generally it will be more convenient, as well as more accurate, to first determine the specific gravity of the substance by one of the usual methods, and then to calculate the specific volume from the figures thus obtained. This method depends upon the principle that specific volume is the reciprocal of, or varies inversely as, the specific gravity, i. e., bodies which have a high specific gravity have a low specific volume, and vice versa. It follows from this relation of the two properties that their product is always unity, or Specific Gravity $\times$ Specific Volume = 1, and that unity divided by either quantity will give the other. From this is derived the rule for specific volume: Divide one by the specific gravity; the quotient is the specific volume, or 1,000 divided by S. G. = Specific Volume.

In like manner the calculation of Specific Gravity from Specific Volume may be expressed by the formula $1,000$ divided by S. V. = Specific Gravity.

REMOVAL OF PYROGALLOL SPOTS.—The brown spots on the fingers caused by pyrogallol may be removed entirely by the application of ammonium persulphate. It is only necessary to rub a little of the moistened crystalline powder on the fingers and rinse them. (Chem. Recp.)

SPIRITUS SAPONATUS, or liniment of soft soap, formerly called tincture of green soap, may be prepared as follows: Dissolve 1.05 part of pure fused caustic potash in 5 parts of alcohol and add 6 parts of olive oil. After a few hours, when saponification is ended, add first 25 parts of alcohol and then 23 parts of water. (Ph. Post.)

EXTRACTION OF TANNIC ACID.—With acetone as solvent the tannin is extracted from sumach leaves along with other substances at a low temperature. The extract is evaporated to dryness and the residue treated with water. Tannic acid dissolves, leaving behind the impurities. (Chem. Ztg.)

(Concluded from page 709, May 12.)

IN THE LAND OF GINGER—JAMAICA.*

BY F. B. KILMER.

GATHERING THE GINGER CROP.

Ratoon ginger is gathered from March to December, but planted ginger is not ready for digging until December or January, and from then until March is the "ginger season."

Ginger is known to be ready for harvest when the stalk withers. This begins shortly before the bloom departs. The rhizomes are twisted out of the ground with a fork. In this operation every bruise or injury to the hands is detrimental to the market value. There is quite a knack in doing this, and it takes long practice to become expert.

The hands are thrown in heaps, the fibrous roots are broken off, and the soil and adherent matter removed. This must be done quickly after removal from the earth, for, should the ginger be dried with the soil and roots still adhering, the product would not be white, and, if it lies in heaps before drying, it will mould. The custom is to throw it immediately into a dish of water. It is then ready for the uncoating or peeling operation. This is done by hand. A planter who has any quantity of it on hand will make a "peeling match" by gathering his own family and whatever help his neighbors can afford. The ginger season thus becomes a time of merry-making.

It was my privilege and a part of my studies to be present at one of these peculiar harvest-home gatherings in Ginger Land. I was given a point of vantage overlooking the dancing hall, which, on this occasion, was the cement floor of the barbecue. The light of a few sickly lanterns, a smoky torch and the hot glare of the tropical moon gleamed on the dusky men and maiden ginger-peelers. Their dresses were marvels in color, the men in somber black, except for white vests and rainbow sashes. Against the dark-skinned forms of the gentler sex were brilliant reds, yellows, greens and blues. Their skirts stood out balloon-like, stiff with cassava starch. Trinkets of silver and gold were very heavy and plentiful. They danced to the music of squeaky accordions, clapping of hands, and the plaintive, wailing, but musical voices of the onlookers. There was plenty of noise—plenty of ginger in that dance. The native "Spiritus saccharum jamaicensis" was dispensed freely, but I have seen less orderly merry-makers in our own land of culture, and in all that excited, hot-blooded crowd not one was drunk or committed any flagrant breach of propriety. Past midnight I lay down on the only bed that the hut of my host Quashie afforded. At intervals I awoke, to find that the ginger dance was still on. When the first rays of light came over the blue mountain peak, there, on the bed, under the bed, sprawled in heaps, over the floor, were the exhausted dancers fast asleep. But, for all, they had made such a night of it, before the sun's rays had entered the cabin they had bathed their bodies in the cool spring, taken a cup of coffee, and were fresh for the day's work.

PEELING GINGER.

Ginger-peeling is an art, and there are many expert peelers in Jamaica. The ginger knife is simply a narrow-edged blade riveted to the handle. In large operations an expert peels between the fingers of the hands, less experienced hands peeling the other portions. Examination of a transverse section of ginger will show the importance of the operation. There is an outer striated skin, under which there are numerous layers of very thin-walled cork cells. This layer contains numerous oil cells, the oil cells being most numerous at the bud points. The oil contained in these cells, in specimens fresh from the ground, is almost colorless, very pungent and exceedingly aromatic. It becomes yellow very quickly on exposure to the air, and, even upon drying without removing the epidermis, its delicate aroma is found to be fleeting. On drying the ginger the contents of these cells appear as a yellow, pitchy mass. (It has been stated that this coloring matter is identical with that of Curcuma.) As this cork layer is the seat of the greatest amount of oil and resin cells, it will readily be seen that the deeper

* Major portion of a paper read at a regular pharmaceutical meeting of the Philadelphia College of Pharmacy and reprinted from the American Journal of Pharmacy.

the peeling so much the more of these substances will be carried away with the epidermis, and more cells opened from which these principles may exude.²

As fast as peeled the roots are thrown into water and washed. The purer the water and the more freely it is used the whiter will be the product. Generally a very little water washes a great deal of ginger. The hands are peeled during the day, and allowed to remain in the water over night. This water acquires a slimy feeling, and, if concentrated, becomes mucilaginous and acquires a warm and aromatic taste. The natives claim that this process soaks out the "fire and poison" from very hot ginger. I placed some pieces in a stream of running water for twelve hours, and succeeded in making them several shades lighter in color. This sample proved to be less pungent to the taste, and it is quite possible the force of the water carried away some portion of the aromatic principles.

A few planters use lime juice in the wash water. This gives a whiter root, having some solvent action on the coloring matter, but, as the lime juice contains saccharine and pectose matter, it prevents drying, and mildew follows. In another experiment I supplied the natives with citric acid, vinegar and acetic acid. They all worked fairly well, citric acid being the best whitening agent, but it was reported that the process was expensive and troublesome.

It is generally stated that ginger is deprived of its coat by being plunged into boiling water before being scraped. This practice is not used to any extent in Jamaica. Its effect is to swell the starch and bassorin-like gums. I found that after keeping the freshly-peeled root-stalks in boiling water for an hour they were considerably swollen and the steam was filled with the aroma of the ginger. Under this treatment the coating comes off easily; but, if the action of the boiling water is prolonged, the starch and fibre are acted upon, the product dries hard and the color is darkened. In fact, what is known as "black ginger" of the market is the result of the process. Ginger is found in the market coated with calcareous matter, such as carbonate of lime, etc.; this is said to fill a demand for "white ginger." Such a proceeding is apparently unknown among the planters. Well-cured ginger has a decided white coating and that is all they know about it.

It has been stated that it is a common practice to bleach ginger with the fumes of chlorine or sulphurous acid. It may be done in the other parts of the world, but no instance of it is known in Jamaica.³ There is scarcely a planter with intelligence enough to use, or who would takes the pains to employ, such a process. I tried chlorine gas as a bleaching agent, but at best the product was of a dirty yellow color. By using the fumes of burning sulphur, the whole being partially enclosed in glass, the heat of the sun adding in the experiment, the ginger was whitened and mildew prevented. I found on trial that it might be of service to place the ginger in a weak solution of chloride of lime before drying; this would aid in bleaching and prevent mould.

CURING GINGER.

After washing, the process of drying follows: The tropical sun is the drying agent in all cases. Large operators have what is called a "Barbecue." This is a piece of ground several feet square, leveled off and laid with stone and the whole coated with cement. It is placed so as to receive the greatest amount of sunshine. The small planter uses what is called a "Mat," consisting of sticks driven into the ground, sawbuck fashion, and across these sticks are laid boards, palm, banana or other large leaves; often, but otherwise, the place for drying is a few palm leaves spread upon the ground.

Careful handlers put their ginger out as the sun rises, and turn it over at mid-day, taking it in at sundown. Rainy or cloudy weather invites mildew. It requires 6 to 8 days for the root to become thoroughly dry. I made several tests to ascertain the loss in weight by drying in the sun, and found the average to be nearly 70 per cent.

² The Jamaica agricultural society has advertised in the United States and England the desirability of a machine or apparatus to be used in removing the coating from ginger; experiments along this line are now being made.

³ Bleaching by chemicals and coating with powders are market processes unknown to the planters.

Ginger dried in the sun for the market examined for moisture gave the following results:

Six samples, well-dried specimens, showed a further loss when dried at 100° C. as follows: 7.2, 8.5, 8.9, 9.5, 10, 11, 12 per cent.

Several poorly dried specimens, some of which were damp and mouldy, gave from 15 to 26 per cent. moisture when dried at 100° C. During the progress of my attention to this subject, several attempts were made to utilize artificial heat in drying ginger. Such a course would, in some respects, be a very desirable one.

In a portion of the island given almost entirely to the cultivation of this product, a few years ago a wet season prevailed. It was impossible to dry the crop in the sun; as a consequence there was a loss of the crop, followed by considerable distress among the planters.

During my observations an attempt was first made to dry without removal of the skin coat. This, if successful, would have meant the saving of considerable labor. The product was quite dark, the flavor not as good as that of the sun-dried. By removing a part of the coat the drying was hastened. Dr. A. G. McCatty, a practicing physician and owner of a plantation, at my suggestion, placed in operation an American fruit evaporator. It was necessary to use wood as a source of heat, and, partly owing to the high temperature and partly from ignorance of the operator, the product so far has been rather poor in quality, the color many shades darker, much of the aroma was lost, and a smoky, burned flavor acquired. Other planters are trying the process on this year's crop.

A curious incident resulted during these experiments. The natives, through prejudice against innovations, boycotted the drying apparatus, and refused to furnish supplies at any price. Experiments were made with calcium chloride as a drying agent. The result did not equal samples produced by the native method of drying in the sun. Attempts made to dry the ginger after first slicing, as might be expected, resulted in great loss of flavor and pungency. My conclusions were that, when well conducted, the native method of careful peeling and curing in the sun would produce a handsomer and a better product than any process yet suggested.

These observations were not undertaken with a view of making any complete analysis, and it was found that a microscopic examination by expert judges was far more reliable than any assay that could be made with limited facilities present in the ginger fields. A few such examinations were made as follows:

Ethereal Extract.—Exhaustion of the ginger with ether in a Soxhlet extraction apparatus. The resultant extract, after evaporation of the ether, was dried over sulphuric acid to remove moisture. From this extract the volatile oil was calculated by the loss on drying the ethereal extract at 110° C. for three hours. The only results from this process that seemed to be of value were that the finer grades, when carefully dried, contained a higher percentage of volatile oil.

Ginger dried without removing the peel gave somewhat higher results as to volatile oils than the peeled. The loss of this constituent was greater in a product dried by artificial heat than when dried by sun. The amount of volatile oil found by the aforesaid process was, lowest, 1 per cent.; highest, 3.20 per cent. The results as to ethereal extract, exclusive of volatile oil or from alcoholic extract from the ether-exhausted residue, seemed to be of little value, the different specimens giving such greatly changing amounts as to afford no guide.

In these experiments some observations were made that were interesting, though of no particular value. In the extracts from ratoon ginger there was evidently a more fiery taste and less flavor than in the planted ginger. This was also true in regard to the extracts from the blue and yellow varieties, the yellow having a much finer odor and taste. Upon the addition of water to these extracts in sufficient amounts to precipitate the dissolved resins, it was observed that in the case of the well-cured specimens of plant ginger a delightful aroma was imparted to the water, a true ginger flavor, without fire or pungency. But in extracts from old ratoon ginger, from mildewed specimens spoiled in drying, this aroma was greatly changed, becoming musty and weak, the taste in some instances being decidedly bitter. Ninety-five per

cent. alcohol was found to give better results as to flavor of extract than that of lower strength.

MOVING TO GINGER MARKET.

When the native tropical sun has fully dried the ginger crop, it is stored in heaps for market day. By unchangeable Ginger Land customs, there are certain days and times to carry products to market. There are banana days, pineapple days, pimento days and ginger days. The buyer must take in his supplies on these days or go without them.

The ginger crop is carried from five to forty miles to a place of sale. In the proper season, along the white-paved roads, from the cool, refreshing hours of the morning far into the night, ginger may be seen moving to market. The richer planter, with a lace bark rope, leads a heavily-laden donkey with panniers heaped. Sometimes piled high on either side, above the ginger are pineapples, plantains, yams, and strange-looking fruits; over all are bunches of knotted sugar cane and nets filled with green coconuts. But by far the greater portion of the ginger, and every other crop, is moved by head-loads.

Troops of Jamaica's brown and yellow daughters are seen trudging up and down hills under the terrible sun, with a load of a hundred pounds or more at graceful equipoise on their gaily-turbaned heads. All have their garments kilied up to their bare dark knees. These women have taken their colors from the fruits; their complexions are orange, olive, sapota, mango, deepening into a bronze-black. They are upright as darts, walk with a free unhindered stride, without any swinging of the shoulders, impressing one greatly with their grace and elegance of motion. Carrying their heads like queens, without nod or turning, they cry out in a high-pitched musical key, to the bystanders, "Marningbuckra," and pass on, their naked feet making a great whispering sound over the smooth roadway. In a picturesque way ginger passes to the market town.

The market may be in the port town or at the cross-roads store. The sign at this latter place reads, in rather shabby characters, "Lisened to dele in Agricultural Produce," which is made to include rum, gin, and a general conglomeration of merchandise, not counting drugs and medicines. In this sort of place anything in the shape of hands and fingers is ginger, and is dumped into a barrel without any sorting, to be shipped to the port. Often the small shopkeeper is heavily in debt to the large trader in the port, and, when ginger is wanted, makes haste to get in as much as possible, regardless of quality.

IN THE GINGER MARKET.

The markets of these West Indies towns are the important centres of commerce. Here, in a large open space near the quay, a great hurry and clatter of brisk business proceeds under the beautiful blue sky and blazing sunshine.

Quashee requires much conversation to complete a bargain. One would suspect by the bustle and noise that the entire wealth of the island was changing hands every few minutes, but the truth is, the most prolonged and loud wrangle closes a transaction involving a minute fraction of a penny. There are a few benches or stalls under the market arcade, but they require a rental fee; so, for many, an upturned barrel outside constitutes a stall. Those who have no barrel pile their wares on the ground between their sprawling black limbs. It is a good place to study fruits and vegetables monstrous in size, with outlandish names, but luscious in looks. Many kinds of drugs are here in their primitive state, ginger in abundance. Nearly every other seller cries out: "Duek-ray-ou-wang-na-foobly" (white master do you want to buy ginger?).

These black people speak with a rolling current of vowels and consonants, pouring them out so rapidly that none but an acclimated ear can detach an intelligible word. The ginger is not weighed, measured or counted, the standard is a "heap." A heap of ginger is a pile that enlarges or diminishes according to the law of supply and demand. If the hands are finely shaped and large, there are fewer in the heap; if they are small, dark and snarly, the heap is made larger. If the price of ginger goes up in London or New York, it is because the heaps in this market have been made smaller. If the price

goes down, these heaps have become larger and finer. The price of ginger in the drug exchanges of the world is the reflection of the changing size of these petty heaps in Ginger Land.

The ruling price in Kingston and Montego Bay for the heap is a penny-half-penny (about three cents). Heaps purchased by me varied according to quality, but the average weight was from one-fourth to one-half pound.

The buyers of ginger for shipping are expert and accurate. They grade, sort and price with a quick eye and ready touch gained by years of practice. The highest grades are large-sized hands of light and uniform color, free from evidence of mildew. This grade is brittle and cracks easily, but broken pieces deprecate the value. Buyers also require the hands and fingers to be firm and full, without wrinkles or spots. They generally assort into four or five grades, that which is shriveled and small being the lowest. The dark varieties form another, the heavy, tough and flinty a third. These four are finally assorted by placing hands which are small but of good texture and color as one grade. The larger-sized, well-bleached hands into the highest grade.

The ratoon ginger sorts generally bring the lowest price, as they are small, soft and soggy, and lack flavor. Ginger gathered green shrivels much in drying, and is less aromatic and pungent then when fully matured. Ginger that has mildewed is spotted, and the mildew starts a decomposition that affects the flavor. Ginger put in bags or laid away before being thoroughly dried will mould and acquire a musty odor and flavor, which it is impossible to remove.

The largest-sized hands are carefully selected by buyers and shipped to special markets, usually to England. I noticed hands weighing as much as eight ounces; many of them weighing from four ounces upward. Ginger is packed in barrels for shipment.

ECONOMICS.

The amount of ginger exported from this island during the last ten years is shown in the following table.*

	Pounds.
1887.....	1,121,827
1888.....	1,141,877
1889.....	1,092,653
1890 (4 years).....	554,193
1891.....	1,219,197
1892.....	1,222,531
1893.....	1,526,884
1894.....	1,672,354
1895.....	1,736,460
1896.....	1,960,609

The amount of ginger imported into the United States from all parts of the world in the years 1890 to 1894, was as follows:

	Pounds.
1890.....	2,228,825
1891.....	2,697,989
1892.....	1,431,295
1893.....	2,927,942

The yield and profit of the ginger crop depend somewhat upon the nature of the soil. In favorable seasons, rainfall, sunshine, planting, care and curing, are also factors. An average yield can be estimated at from 1,000 to 1,500 pounds dried ginger per acre. In exceptional cases, 2,000 pounds have been gathered. There are planters in Jamaica who plant ginger here and there in patches, and gathering as little as a hundred pounds in a year. Ginger is well adapted to the small planter, and admirably suited to the peasantry of Jamaica, who, by slow evolution, are passing from serfdom to manhood and independence.

The exact cost of producing this crop is difficult to calculate. The present output is largely the product of domestic labor, whose value is hard to compute; when this class of labor is hired, it becomes very costly. The figures in the following table are approximate only; as now conducted there is chargeable against the crop the item of rent, or tax (if the cultivator is an owner), the labor is mainly that of the family.

An approximate estimate of the expenditures and receipts on an acre of land planted in ginger are as follows:

*Figures obtained from the office of the collectors-general of Jamaica show that more than one-half of the crop is shipped direct to the United States ports.

Ground rent or tax.....	\$ 5
Clearing land, plowing and planting.....	40
Cost of plants.....	50
Digging and preparing.....	15
Peeling.....	45
Drying.....	25
Delivery at market.....	10
	\$190
Fertilizer (if used).....	50
Superintendence.....	20
	\$260

Yield, 1,500 to 2,500 pounds (cured sugar), at 12 cents per pound, \$180 to \$300.

Viewed from this standpoint, the cultivation of ginger on a large scale would be far from remunerative. In this connection we may note that a Royal Commission, appointed to investigate the depressed condition of the Industries in the West India Islands, have recently submitted a report to Her Majesty's Government. Among the recommendations made was "The settlement of the laboring population on small plots of land as peasant proprietors." This corroborates our view that, from the Jamaica standpoint, it is better economy to allow the cultivation of ginger to remain where it is. The introduction of artificial heat for drying, machinery for peeling, will have a tendency to deprive the peasantry of a source of income, and this, so far as these investigations show, will not improve the quality of the product.

The Botanical Department, through its corps of agricultural instructors, is now going among the people and showing them exactly what may be done in the way of improving their methods of cultivation. The Jamaica Agricultural Society is conducting practical and extensive demonstrations to show the use and value of fertilisers. They have already an important bearing upon this crop. Information recently to hand states that the crop which will be gathered in the coming season (Spring, 1898), will probably be the largest ever grown upon the island. This is due to the improvement in cultivation, together with an abundant rainfall. Unfortunately for the ginger planter, a largely increased production will tend to lower prices.

GERMS, WHAT THEY ARE AND HOW THEY PRODUCE DISEASE.*

BY FREDERICK G. NOVY, SC. D., M. D., MEMBER OF MICHIGAN STATE BOARD OF HEALTH.

The word germ is a popular and useful term employed to broadly designate microscopic living beings. It matters not whether these beings are animals or plants, as long as they are so small that the microscope is necessary in order to see them. The term microbe literally means microscopic life, and consequently the two words, germ and microbe, have the same meaning. Just as there is a greater world represented by the ordinary, every-day higher plants and higher animals, so there is a lesser world, not seen by the unaided eye, represented by lower forms of animal and plant life. The microscope is absolutely necessary to see and to study these simple living beings.

Although they are so small as to merit the designation of "infinitely little," they are nevertheless of utmost importance to man, to higher animals and to higher plants. The animal germs are as yet but imperfectly known. The parasite of malaria belongs to this group, and may be considered as an excellent type. On the other hand, the vegetable germs have received the lion's share of attention on the part of students throughout the world. They have been proven to be the causes of fermentations and putrefactions whereby the lifeless remains of plants and animals are not merely removed from the surface of the earth, but are converted into simple compounds which serve as food for new life. These microscopic plants are truly Nature's own scavengers. But for them the surface of the globe would be one vast charnel house, made up of layer on layer of dead plants and dead animals. Carbon, nitrogen, oxygen and other elements are brought together from the air and soil by the living plant and combined into those complex molecules represented by the proteids, sugars,

starches and fats of our food. Without the intervention of these exceedingly small plants, these vegetable germs, the carbon, nitrogen and other elements would remain entombed forever within the lifeless plant and lifeless animal. These elements, so indispensable to life, would be thus withdrawn for all time from the general supply. They would be as useless to new life as the carbonic acid contained in the vast limestone deposits of the earth's crust. It is evident that the continuous consumption and hoarding up of these elements so precious to life would gradually but surely diminish nature's stock to a point where all life on this earth would cease.

Germs, then, are of importance to the existence of man, higher plants and higher animals. The great majority of germs are content to live on dead plants and dead animals. In doing this they fulfill a role which, as pointed out, should not be lost sight of. A relatively small number of germs are not content, so to speak, to live on dead matter. They enter the living tissues of man, animals and plants and live, not merely at the expense, but frequently to the detriment, to the injury of these hosts. It is to this relatively small group of organisms that we apply the term disease germs.

Microscopic plants, or vegetable germs, can be divided into a number of large groups or families. Three of these large families especially claim our attention. They are the yeasts, moulds and bacteria. Within the past decade or two the latter group has attracted the widest attention, such as has never been given to any other group of organisms. The reason for this close study of such extremely small organisms is very evident when we remember that more than one-third of the human beings that die, die of communicable diseases, or in other words, of germ diseases.

In the State of Michigan more than 10,000 lives are lost annually as a result of accidents known as communicable or infectious or germ diseases. In the United States as a whole more than a quarter of a million of human beings annually yield in the struggle with three or four disease germs. We dread to think of the enormous loss of life that would result if a war broke out between two or more of the great nations. All the machinery of destruction that man ever invented, or can invent, will not equal in destructiveness these small microscopic plants that wage a constant, silent, unceasing warfare. In addition to those that die of communicable diseases, several times that number are sick of these diseases, but recover. When we add to this enormous number of suffering human beings, the loss in domestic animals and in plants from other germ diseases, we can readily understand why bacteria claim our closest attention. The brilliant results that have been achieved in surgery, in hygiene, and in rational medicine within less than a score of years, show that the deadly foe is not invincible, but that it can be met and defeated on its own ground. To discover the means for the prevention and for the cure of these diseases is the task set up by scientists. Such work is obviously humanitarian in the highest sense of the term, and should be encouraged by public sentiment and by liberal appropriations or donations.

Bacteria, then, are microscopic living plants. Although in popular language the terms, bacteria and germs, mean the same thing, yet it is well to bear in mind that the former constitute but one large group of the latter. They are the simplest of plants, made up of a single cell. While the higher plants and higher animals are made up of aggregations of cells, each of which has distinct work to do, the bacterial organism offers no such complexity in structure. It is a uni-cellular organism. Every cell that we see with the microscope is in itself a perfect individual. It nourishes, grows and multiplies entirely by itself, wholly independent of the other cells that constitute the community, the busy world in which it lives.

Under the microscope bacteria present marked differences in form. They may be spherical, like minute marbles, or like beads on a rosary. This type is designated by the generic name of *micrococcus*, meaning a small ball. Again, there are bacteria which are rod-shaped or cylindrical in form, which we can compare

*An address before the Sanitary Convention held under the auspices of the Michigan State Board of Health, at Detroit, December 9 and 10, 1897.

to a short lead pencil, or to a stick of chalk. These, on account of their rod-shape, are designated by the generic term of *bacillus*. A third type is not infrequently met with, and this is known as the spirillum. It is spiral or screw-shaped.

To speak of these organisms as microscopic is hardly sufficient to give a correct impression as to their relative size. They are not merely microscopic in size, but they are the smallest of living beings known to science. Our blood contains microscopic cells, the so-called blood-corpuscles, but these are nevertheless giants in size compared with the bacterial cell. Frequently 10 or even 20 of the spherical germs may be found in a row, the length of which corresponds to the diameter of a blood cell. In other words more than 25,000 spherical germs must be placed side by side to make an inch in length. If one grain of such a germ was weighed out, it would contain more than 500,000,000 individuals. It is evident, therefore, that many thousands of organisms may be present in what we consider a small amount of material. A drop of blood from an animal that dies of anthrax not infrequently contains more than ten millions of these minute organisms.

If the size of these bacteria excites our wonder, we will be even more surprised to learn of the multiplication of these organisms. The young cell grows rapidly and reaches the adult size. It then proceeds to multiply in a very simple manner. It divides in the middle into two equal parts, each of which becomes at once a perfect individual. Two cells in this way result by division from one parent cell. Both of these grow and presently divide, yielding thus four cells. This process of doubling continues so long as the conditions for growth continue favorable. When the food is used up, or when the soil on which they are growing becomes impregnated with their waste products, growth stops. Under favorable conditions a cell is known to divide and form two cells in less than half an hour. A simple arithmetical calculation will show that starting with a single cell, if this rate of division continues, there will be in 24 hours no less than 17,000,000 descendants of that original cell. In 48 hours the total would exceed 280,000,000. These figures are theoretical, it is true, but they teach us that small as these organisms are, they are capable of powerful action in a short time because of this rapidity of multiplication.

Like all living beings, bacteria require food in order to grow and multiply. As has already been indicated, they find this food in the material composing dead plants and dead animals. When an organism grows, it changes the food into its own substance. It builds up new material just as the growing plant makes starch, or the growing animal makes muscle and other tissue. Besides giving rise to new chemical substances which are useful, even necessary, to the life of the cell, the organism will throw off waste matter, which is more or less injurious to it. All living cells are constantly building up and tearing down complex chemical substances; they are effecting synthetic and analytic changes. Bacteria are no exception to this general law. They give rise, therefore, to a countless variety of chemical products. Various gases, such as nitrogen, hydrogen, carbonic acid, marsh-gas, etc., are formed. Diverse acids, alkalies, alcohols, ferments and the like are known as bacterial products. Certain bacteria may elaborate, among other things, one or more poisonous substances.

There are two groups of these poisonous substances which deserve special attention in this connection. They are known as ptomaines and toxins. The former are basic substances, resembling in their chemical behavior the so-called vegetable alkaloids, such as morphine and strychnine. These are often poisonous, and for this reason the ptomaines have been considered as the means by which bacteria render food poisonous, or produce the effects observed in disease. The ptomaines, however, are relatively weak poisons, so much so that they cannot account for the intensely poisonous effects observed. Chemists have sought for these actively poisonous bacterial products. They have been able to isolate in several instances wonderfully poisonous substances, the exact nature of which is as yet wholly unknown. These unknown powerful bacterial poisons are designated as *toxins*. These, when purified as far as it has been possible to do so, may be said to be the most powerful poisons

known to man. The deadly morphine or strychnine is a weakling compared with the toxins produced by the germs of diphtheria, of tetanus and other organisms. We may compare these bacterial toxins to the poison contained in the venom of serpents, or to certain vegetable poisons, like abrin and ricin, contained in jequirity seeds and castor beans. The purified tetanus toxin is so poisonous that five hundred millionths of a gram was fatal to a 15-gram mouse. To make this astounding figure a little more intelligible, we will say that a mouse weighing half an ounce is surely killed by a dose of this purified poison amounting to 1-1,125,000 of a grain. The calculated fatal dose for a man weighing 155 pounds would be 1-280 of a grain. The tremendous activity of this poison is without an equal in the whole range of toxicology. It is the study of poisons of this kind that teaches us of what fearful weapons bacteria are possessed. It is possible from this to understand how the tetanus bacillus, localized in a small wound in the body, is capable of producing most powerful effects in the entire organism.

There are other bacteria that produce nearly as poisonous products, as the tetanus, or lock-jaw germ. Unlike the ptomaines, which are analytic products, formed by the splitting up of the complex proteid molecule, these toxins are synthetic products, made by the germ within the cell itself. These poisons are soluble, and in some cases may therefore readily pass out of the cell into the surrounding liquid. If we filter the liquid in which diphtheria or tetanus germs have been grown, the filtrate will be found to be intensely poisonous because of the presence of this soluble poison. In other germs, the poison is held more firmly within the cell. The liquid on the outside is but slightly poisonous. When such cells die, the toxin is liberated from the cell in which it has been confined. By careful grinding in a mortar, it is possible to break up the cell, and in this way to bring the toxin present into solution.

Recognizing, then, the important fact that while most germs are harmless, there are some that can produce alongside of various other products highly poisonous substances, it will be clear that such germs can induce disease in man and other animals, and even in plants. It not infrequently happens that such poison-producing germs enter food which is kept under conditions suitable for the growth of germs. The food may be meat, sausage, chicken, oysters, milk, cheese, ice-cream and the like. Such a poison germ once introduced into the food will, as has been pointed out, multiply very rapidly, if a suitable temperature prevails. The result is that that which was once a good food becomes a deadly poison. Too much care cannot, therefore, be taken in properly preserving or keeping food. It should be kept for as short a time as possible, in a cold place and should be thoroughly cooked before use. Attention to simple precepts of this kind will greatly lessen the occurrence of food poisonings.

Germs may be introduced into the living body through scratches, cuts or wounds; through the air we breathe, or through the food we eat and the water we drink. We are constantly in contact with germs from the moment when the first gasp of breath announces life in the new born. Fortunately, the vast majority of germs that we come in contact with are harmless. They have not the power of engaging in active warfare with the cells of the animal body; they have not the ability to make deadly poisons. Let, however, a poison-producing germ enter the body, along one of the several avenues indicated; let it once overcome the natural resistance of the body and begin to grow, multiply and elaborate its poisons, the result will be disease.

CARBONATE OF POTASH.—In consequence of the low price of electrolytically prepared caustic potash, the manufacture of so-called potassium chloride-potash has been practically discontinued. Only a comparatively small quantity of it is still made for special purposes. Molasses-potash, which was formerly much used for the preparation of soft soap, has been displaced largely by electrolytic potash solution. Refined molasses-potash, used particularly in the manufacture of potash-glass and not replaceable in this industry by other kinds of potash, has fallen in price to such an extent that its manufacture has become unprofitable. (Südd. Ap. Ztg.).

IPECACUANHA.*

Where It Grows and How It Is Collected.

BY A SOUTH AMERICAN EXPLORER.

The shrub which yields ipecacuanha (*Cephaelis Ipecacuanha*), or poaya, as it is called by the Brazilians, grows in the forests of different parts of South America, but principally in the State of Matto Grosso, Brazil. There its area of distribution is somewhat restricted, having only been found hitherto in the dense humid forests which clothe the right bank of the Paraguay River and its tributaries in the neighborhood of the fifteenth degree of Southern latitude. It is a curious circumstance that none of the ipecacuanha plant is found on the east side of the Paraguay, but on the west side it grows amidst the gorgeous wealth and variety of tropical flora, a small and unpretentious-looking plant, devoid of brilliant flowers or anything striking in its leaf form to distinguish it from the surrounding foliage, and has given rise to an important industry which formerly gave employment to a considerable number of native Brazilians; but the rubber industry has drawn many of them away from ipecac collecting.

Time of Collection.

The collection takes place more or less during the entire year, but especially during the wet season—i. e., from October to March—as the increased humidity of the soil facilitates the extraction of the root. As an offset to this advantage, the poayeiro, as the collector is called, is more exposed during this period to malarial fevers, which then assume a more virulent form.

Digger and Patron.

The *modus operandi*, which obtains among the poayeiros is analogous to that in vogue among rubber and Paraguayan tea collectors, as well as lumbermen, in other parts of South America. A collector, having obtained from his patron or master an advance of some £10 or £20 in cash or goods, obliges himself to repay in ipecacuanha, to be delivered within a given time at so much per arroba, or 32 pounds. When delivery is made the patron deducts from the value of the product the amount advanced, and hands the balance, if any, to the collector. Should the latter, from sickness or any other cause, have failed in making delivery of sufficient to cover the advance, he remains in his master's debt until such time as he can make repayment. In the transaction the master is always careful to stipulate that the amount to be paid per arroba to the collector is considerably less than what he considers will be the market value of the ipecacuanha when delivered, so as to leave a margin on the right side. I may say, in passing, that the value of the drug when brought to the patron is about 130 milreis per arroba—say, 3s. per pound—and unless some special effort is made to organize the collection, I do not see any hope of the price being reduced. The digger receives two-thirds of the value of the root. In the event of the death or desertion of the collector before repayment of his debt, the patron has no way of recouping himself for his outlay, and, as he considers that he is taking considerable risk, he usually manages to make his advances in goods, like food, clothing, etc., at such a high rate that his profits on the goods are calculated to make up for any deficiency in the amount of the ipecacuanha delivered. The system, although not free from objections, is the only one possible in a country where labor is scarce, and it has often been the means of raising poor, but sober and industrious men into positions of comparative opulence; but in the hands of unscrupulous masters, it may give rise to abuses. The fevers referred to seldom have a fatal termination, and though deserters may for a time evade the vigilance of their masters, they are usually captured, and, after a few days under discipline, return to work.

The Digger at Work.

Let us suppose, then, that a collector has received an advance from his patron, and follow him into the forest. Having provided himself with a supply of jerked beef, rice, mandioca meal, rapadura (unrefined black sugar), and bacon, he packs those with his rude cooking utensils and sleeping hammock into the raw

hide bags or paniers of his pack ox, and sets out, accompanied by his wife or paramour, children and a wretched-looking cur. He goes in light marching order. His simple dress consists of shirt and pants of cotton—the latter grown by the side of his hut and spun by his womenfolk in their spare moments. His hat is manufactured by himself from the inner unopened leaves of a fan palm tree, which graces a knoll hard by his house. Sandals cut from untanned bullock hide, and secured to his feet by strips of the same material, a huge knife stuck in his belt, and an old-fashioned, long, small-bore muzzie loader slung over his shoulder, complete his equipment. Arrived in that part of the forest where the object of his search grows thickest, our friend speedily makes his encampment, as near to his clump or patch as possible. Proximity to water is the main issue he considers in the selection of a site for his dwelling, and two walls, formed by sticks and palm leaves, placed some few feet apart at the base and ascending at an angle of 45°, so as to meet at the top, are the embodiment of his architectural ideas. Thus quartered, he soon gets to work. Having taken a substantial meal at dawn, he arms himself with a stout stick, about 4 feet long, provided with a conical iron point, called a *saracua*, and having arrived at his ipecacuanha patch, loosens the earth around the plants, draws up the curious-looking root, ringed like an earthworm, breaks it off, and throws away the stalk and leaves. The root is generally about an eighth of an inch in thickness, and when dried is of a grayish-brown color externally. The collector continues his work all day, until about 4 o'clock in the afternoon, when the declining sun advises him that it is time to return to the *felteria*, or encampment. The amount collected per day varies considerably, much depending on the richness of the patch; but of recent years it has been difficult for an active workman to secure more than four or five pounds of the root, although at one time it was possible to gather as much as twenty pounds in a day. The collected roots are dried by spreading them on bullock hides and exposing them to the sun for a few days.

The Digger at Play.

On Saturdays or Sundays the poayeiro pays a visit to the village of Sant' Anna, in order that he may hear the gossip of other collectors, and often, alas, to further increase his indebtedness to his patron. On such occasions he joins with his fellow collectors in a *cururu*—half dance, half drinking bout. The music, which is furnished by thrumming a small three-stringed viola or guitar hewn out of a solid block of wood, accompanied by the rasping sound produced by drawing a notched stick over a smooth stick, is certainly "long drawn out," and an unprejudiced listener might fail to discover "the linked sweetness." The dancing consists in marching round in a circle, and, in addition to the rude harmony, is generally accompanied by a song in which the art of improvising is called into requisition in honor of any distinguished guests who may be present. It is a strange blending of the customs introduced by African negro slaves and those of the natives of South America, while the employment of improvisation recalls the troubadours of Provence, Spain and Italy, and the wandering minstrels of our own land.

Thus, between work and play, the time passes, and if the collector has had a good season he may settle up with his patron with sufficient balance in his favor to enable him to pass his time without working very much until another season comes around. But too often he finishes up the season more deeply in debt than when he started, especially if his patron is one of those who, knowing his man to be too honest to run away, and too robust to succumb to fever, willingly increases his indebtedness by making further advances. Should the collector show signs of sickness during the period of indebtedness the patron is all solicitude. He doses his patient with sulphate of quinine, aconite, etc., until recovery, and does not forget to charge all such medicines in the bill.

Baling.

The ipecacuanha, after being baled by the patron, is shipped to Sao Luiz de Caceres in canoes, whence it leaves by river steamer for Montevideo, en route for Europe.

*Reprinted from the Chemist and Druggist.

Customs due on the export are payable at the town of Corumba, where the Custom House for the State of Mato Grosso is. The operation of baling is a most wasteful one, and there is great room for improvement in it. It consists simply in bundling the ipecacuanha into a heap and beating it with sticks until it assumes the shape of the bale which is so familiar to druggists. During the beating process there is much waste of the root by breakage and dust, and the effect of the process upon the beaters is distinctly alarming, as bleeding from the nose frequently occurs, due partly to the irritating action of the ipecacuanha upon the mucous membrane, and partly to excessive physical effort. Altogether the time spent in baling and the waste of drug must add, I should say, 25 per cent. to the cost, and this could easily be avoided by the use of a hydraulic press. I would suggest that the London consignees of ipecacuanha should take this suggestion into consideration.

The Future of the Industry.

The short-sighted greed and ignorance of the collectors have within the last few years reduced the importance of the industry by adulterating their produce. This is done by mixing with the genuine articles small sticks and roots entirely wanting in the alkaloid emetine. The detection of this has led to a falling off in the price of and demand for Mato Grosso ipecac, while the importation into Europe of the inferior and cheaper quality of the drug from Cartagena, in New Granada, has also doubtless tended to destroy what was once practically a monopoly for Mato Grosso. The number of men now engaged in collecting does not probably exceed 400, and if the collection of rubber goes on increasing at the present rate, I anticipate that the number will be still further reduced.

The forests where the plant grows are Government lands, and have not hitherto been alienated to private individuals, every one apparently having the right to work undefined areas on no other title than that conferred by discovery and occupancy.

Attempts to cultivate the plant in India have not hitherto met with success, but no one has as yet given the subject that amount of scientific attention which it deserves in its own natural habitat. It has been proved that the stems thrown away by the collectors, after breaking off the valuable part of the root, again take root, and thus reproduce; but this would seem to be conditional on at least a small portion of the annulated root having been left on the leaf stem. Reproduction also takes place from seed, and it is thus highly improbable that the plant will become extinct in its native habitat. A well directed exploration in the forests to the west and northwest of those which up till the present have formed the field of exploitation would probably reveal virgin fields or clumps.

CONSTITUENTS OF OLEORESIN OF MALE FERN.

—According to Prof. Boehm, in Leipzig, the value of this preparation depends on the presence of aspidin, as well as that of fillicic acid. Out of eleven preparations examined, six contained aspidin in large proportion, 2 to 3 per cent., while fillicic acid was absent; four contained fillicic acid, but no aspidin; and one contained small quantities of both. These results are of interest, as they apparently show that a high content of aspidin excludes the presence of fillicic acid and the reverse. Prof. Boehm concludes after an experience of many years that an oleoresin containing principally aspidin is decidedly preferable to one rich in fillicic acid, and speculates on the circumstances that may cause the one or the other constituent to predominate. The possibility that in the finished extract fillicic acid is converted into aspidin or vice versa, was disproved by experiments made in that direction. Neither can the age of the drug alone be the cause, as each of the eleven specimens examined was prepared from fresh root, and yet a great difference was found in the composition. The time of year (spring or autumn), of collecting the root has also been proved to have little influence. On the other hand, everything points to the habitat and conditions of growth, as also the many varieties of *Aspidium filix mas*, as the principal influence in the formation of aspidin or fillicic acid (Sudd. Ap. Zig).

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc. Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Anonymous "Charles."

"Charles," who writes from Philadelphia and wants to use this department for his private benefit, should remember that we pay no attention to anonymous communications. This Question Box is maintained for the sole use of our subscribers or their clerks. Full name and address must be signed to all communications.

Solubility of Benzoic Acid.

(S. C. H.) asks criticism upon the following:

Codine	.....	6 grains
Benzoic acid	.....	4 drams
Syrup tolu	.....	3 ounces
Camphor water	.....	3 ounces

Mix. Two teaspoonfuls every four hours.

The difficulty here is due to the insolubility of the benzoic acid in the liquids of the mixture and therefore a clear solution cannot be dispensed. Benzoic acid requires 500 parts of water to effect solution, though the solubility may be considerably increased by the presence of borax or sodium phosphate. The addition of either of these salts is not admissible in this prescription, however, on account of the reactions which may take place between them and the codine and camphor water. The prescriber should be informed of the difficulty, for, unless he wants the mixture sent out under a "shake label," the prescription should not be dispensed.

Egg and Custard Powder.

(Baker). The following formulas are said to be employed by manufacturing bakers:

Egg Powder.

Sodium bicarbonate	.....	8 ounces
Tartaric acid	.....	3 ounces
Cream tartar	.....	5 ounces
Turmeric, powdered	.....	3 drams
Ground rice	.....	16 ounces

Mix and pass through a fine sieve. One teaspoonful to a dessertspoonful according to article to be made), to be mixed with each half pound of flour. Two teaspoonfuls equal one medium sized egg.

Custard Powder

(1) Arrowroot	.....	8 ounces
Cornflour, best	.....	8 ounces
Saffron, powdered	.....	10 grains
Oil bitter almonds	.....	24 drops
Oil nutmeg	.....	12 drops

Mix the powders in a mortar, gradually add the oils and pass through a fine sieve.

(2) Arrowroot	.....	8 ounces
Rice flour	.....	8 ounces
Gum tragacanth	.....	14 ounces
Powdered turmeric	.....	24 drams
Oil bitter almond	.....	20 minims
Oil lemon	.....	20 minims
Oil nutmeg	.....	10 minims

Restoring and Preserving Rubber Goods.

(B. S.) A number of formulas and processes have been suggested for this purpose. We give them for what they are worth:

(1) Soak in the following: Ammonia, 2 ounces; water, 6 ounces. (2) Try kerosene. (3) Very elastic caoutchouc (tubing gradually loses some of its elasticity. Later the tubes break on stretching, even if previously laid in warm water, and finally they crack if pressed between the fingers. This change is put down to a very slow formation of sulphuric acid by the action of the moist air on the sulphur contained in the caoutchouc. By frequently washing with slightly alkaline water, the action of the acid is prevented. Tubes washed five or six times a year remain perfectly elastic. (4) Very old rubber hose will become hard but this hardness

can be removed by dipping in petroleum and allowing the hose to hang up for a couple of days. (5) A writer in the "Scientific American Cyclopaedia of Receipts" states that old hard India rubber may be softened again by letting the vapor of bisulphide of carbon act upon it. As soon as it has become soft it must be removed from the carbon bisulphide atmosphere. Hard stoppers are easily made fit for use again, but the elastic properties of tubing cannot well be restored.

Electric Battery for Electric Bells.

(J. J. R.) The Leclanche battery is one of the best for open circuit work, and it is in very general use for electric bells, its great recommendation being that, once charged, it retains its power without attention for several years. So long as the circuit is open there is no action in the cell, and as a consequence there is no loss. Two jars are employed for its construction (see Dec. 2 Era of last year, page 833); the outer one is of glass, contains a zinc rod, and is charged with a solution of ammonium chloride. The inner jar is of porous earthenware contains a carbon plate, and is filled up with a mixture of manganese peroxide and broken gas carbon. When the carbon plate and the zinc rod are connected, a steady current of electricity is induced, the chemical reaction taking place being outlined by Dyer as follows: The zinc becomes oxidized by the oxygen from the manganese peroxide, and is subsequently converted into zinc chloride by the action of the ammonium chloride. After the battery has been in continuous use for some hours, the manganese becomes exhausted of oxygen, and the force of the electrical current is greatly diminished; but if the battery be allowed to rest for a short time, the manganese obtains a fresh supply of oxygen from the atmosphere, and the battery is again fit for use. After about eighteen months of work the glass cell will probably require recharging with ammonium chloride (saturated solution), and the zinc rod may also need renewing, but should the porous cell get out of order, it is better to get a new one entirely, than to attempt to recharge it.

Sterilized Oil.

(E. S. E.) asks how to prepare sterilized oil employed in the following prescription:

Iodine	1/2 grain
Bromine	1/2 grain
Phosphorus	1-100 grain
Thymol	2-3 grain
Menthol	2-3 grain
Sterilized oil	1 dram

To be used in one injection.

Several fixed oils, particularly olive oil and oil of sweet almonds, have been employed by practitioners for the subcutaneous administration of certain remedies, and any one of them after sterilization may properly be called a sterilized oil. Vaseline oil has been similarly employed. The oil may be sterilized by placing it in a sterilizing flask and carefully heating it at 120 deg. C. in a sterilizing oven. The details for preparing and sterilizing these medicated oils for hypodermic injection are given by Vicario as follows: Solution is first effected by mixing the ingredients, if liquid, or by producing solution by means of a water bath, in which latter case the most volatile substance must be added after the others have become liquid. The oily solution is then placed in a sterilizing flask (Pasteur's retort, Chamberland's pipette flask, or any bottle with a long narrow neck which may be best stoppered with a pellet of cotton), and then heated in a sterilizing oven at the temperature indicated above (120 deg. C.). The liquid is then transferred under proper precautions into previously sterilized small bottles. If a Chamberland's flask, having a bent neck drawn out to a fine tube fused at the end, is used, the end of the tube may be broken off after sterilization is completed and the tube pushed through the cotton stoppers of the small bottles, thus transferring the liquid without risk of reintroducing germs or bacteria. The above formula is identical with that proposed by Dr. Charles Wilson Ingraham, of Binghamton, N. Y., under the title of "bromine-iodine compound" and by him recommended in the treatment of pulmonary tuberculosis (Amer. Medico-Surg. Bul., March 15, 1895, page 339).

and New York Med. Journal, Oct. 23, 1897, page 565). He says that "after uniting the elements and thoroughly dissolving them in the oil, the mixture should be allowed to stand in a glass mortar for at least twelve hours, and frequently subjected to thorough stirring. After this, it should be placed in a filter; in some instances it is necessary to filter two or three times. The greatest care should be taken to obtain chemically pure drugs. The compound is of a dark cherry color, and when properly prepared will remain for months without undergoing decomposition."

Glycerine Jelly.

(E. A.) You may make a lotion or jelly of almost any desired consistence by using enough Irish moss. Mucilage of quince seed may be considerably thickened by evaporating some of the water. This procedure is not very satisfactory, however, as however made the mucilage does not keep well and it should be only employed in preparations for immediate use. In most of the toilet or cosmetic jellies the "body" consists of gelatin, starch, tragacanth, or similar substances, the amount used depending upon the stiffness or consistence of the preparation to be made. Here are formulas for glycerin jelly:

- (1) Glycerin..... 1 fl. ounce
Corn starch..... 1 dram
Water..... 1 1/2 drams
Otto of rose or extract white rose. . . Q. S.

Mix the starch, glycerin and water, and bring to the boiling point; when cold add the perfume and color if desired with solution of cochineal or red aniline.

- (2) Gelatin..... 1 ounce
Glycerin..... 16 fl. ounces
Water..... 3 fl. ounces
Oil rose..... 2 drops
Oil lavender flower..... 10 drops

Soak the gelatin in the mixed glycerin and water for 12 hours, then heat on a water bath until dissolved, and finally add the oils. Other odors may be employed.

- (3) Mucilage Irish moss (thick)..... 4 ounces
Glycerin..... 6 fl. ounces
Distilled extract witch hazel..... 4 fl. ounces
Cologne water..... 2 fl. ounces
Borax..... 30 grains

Dissolve the borax in the witch hazel extract, mix with three fluid ounces of glycerin and with the cologne, add slowly to the mucilage previously mixed with the remainder of the glycerin. After standing a few hours strain the mixture.

Roup in Poultry.

(J. J. R.) The following description of the disease and methods of treatment is abstracted from a work on the diseases of poultry:

The first symptoms of roup are those of a cold in the head. Later on the watery discharge from the nostrils and eyes thickens and fills the nasal cavities and throat, the head swells and the eyes close up and bulge out. The odor from affected fowls is very offensive. It is contagious by diffusion in the air and by contact with the exudations from sick fowls. To disinfect houses and coops burn sulphur and carbolic acid in them, after turning the fowls out and keep closed for an hour or two. Pour four ounces each of turpentine and carbolic acid over a peck of lime and let it become slaked, then scatter freely over the interior of houses and coops and about the yards.

For the first stages, spray the affected flock while on the roost or in the coop with a mixture of two tablespoonfuls of carbolic acid and a piece of fine salt as big as a walnut in a pint of water. Repeat two or three times a week. Or, if a dry powder is preferred, mix equal parts of sulphur, alum and magnesia and dust this in their nostrils, eyes and throat with a small powder gun. The nasal cavities should be kept open by injecting with a glass syringe or sewing machine oil-can a drop or two of crude petroleum. A little should be introduced also through the slit in the roof of the mouth. Give sick birds a dessertspoonful of castor oil two nights in succession, and feed soft food of bran and corn meal, seasoned with red pepper and powdered charcoal. The following treatment is also advised: Hydrastin, 10 grains; sulphate of quinine, 10 grains; capsicum, 20 grains. Mix in a mass with balsam copaiba and make into twenty

pills give one pill morning and night; keep the bird warm and inject a saturated solution of chlorate of potash in nostrils and about 20 drops down the throat.

A "roup powder" may be prepared from one of the following:

- | | |
|--|----------------------|
| (1) Potassium chlorate..... | 1 ounce |
| Powdered cubeb..... | 1 ounce |
| Powdered anise..... | $\frac{1}{2}$ ounce |
| Powdered licorice..... | $\frac{1}{2}$ ounces |
| Mix a teaspoonful with the food for twenty hens. | |
| (2) Ammonium chloride..... | 1 ounce |
| Black antimony..... | $\frac{1}{4}$ ounce |
| Powdered anise..... | $\frac{1}{2}$ ounce |
| Powdered squill..... | $\frac{1}{2}$ ounce |
| Powdered licorice..... | 2 ounces |

Mix and use as in the foregoing.

Pills for Roup.

- | | |
|--|---------|
| Calomel..... | 1 grain |
| Antimonial powder..... | 1 grain |
| Powdered licorice..... | 1 grain |
| Balsam copaiba, q. s. to make pill mass. | |

For one pill. One twice a day to each fowl.

PHARMACY.

BLOODCHAR, or Blutkohle, is carbon obtained by charring dried blood, and it is used very much in the same way that bonechar is for decolorizing saline, saccharine, and other solutions.

CERES POWDER, a substance advertised as a preventive of grain smuts, is, according to the analyses of Hollering and other German investigators, only crude potassium sulphide, sold under another name and at a much higher price.

POLYSOLFIN, a preparation for the laundry, whose effect is stated to depend on the presence of a high percentage of sulphides and poly-sulphides, and recommended for all kinds of clothes, has been found to consist entirely of crude soda. (Ph. Post.).

LEAKY WOODEN VESSELS are restored, according to A. Gawalowski, by soaking first in a solution of glue until saturated, then in a solution of sugar, molasses or glycerin in water, and finally in a solution of sodium silicate. Wooden utensils so treated become impervious and are very durable. (Drog. Ztg.).

PREPARATION OF PIPERAZINE SALICYLATE.—Concentrated, boiling, aqueous, alcoholic or ethereal solutions of piperazine and salicylic acid are mixed in the proportion of 1 molecule of the former to 2 of the latter. Or, the components are fused together and the product dissolved and recrystallized. The salt is soluble in water, alcohol and ether, and melts at 215° to 218° C. with decomposition. (Ap. Ztg.).

PHOSPHORUS.—England had heretofore a monopoly of the manufacture of phosphorus, and demanded high prices for it, but of late several factories have arisen in France and Russia, and are in course of construction in Germany. At the present time, England produces about 2,000,000 pounds, France and Russia together about 1,000,000. A revolution in the consumption of phosphorus is expected, in view of an Austrian patent for the manufacture of phosphorus-free matches, that at the same time are cheaper. (Südd. Ap. Ztg.).

PREPARATION OF THYMOL IODIDE.—This preparation, which is used externally as an antiseptic, is made as follows: Dissolve 50 parts of thymol, 58 parts of potassium iodide and 50 parts of sodium hydra in 500 parts of water and pour the solution in small portions into 2,500 parts of a saturated solution of sodium chlorate. Wash the precipitate formed with water until free from chlorine, dry it at a temperature not exceeding 27° C. and keep it in powdered form in a well stoppered bottle. It contains 45 per cent. of iodine. (Ph. Post.).

VANILLIN-PARA-PHENETIDIN is a new remedy, recently patented, which is expected to find application

as antipyretic, disinfectant and styptic. It is obtained either by heating vanillin and para-phenetidin together, or by subjecting a solution of them to a high temperature. The product is purified by recrystallization from petroleum ether or other suitable solvent. It forms yellowish, prismatic crystals, having a feeble vanilla odor, and dissolves readily in the usual solvents and in dilute alkaline solutions. The sulphate forms fine, yellow needles, which melt at 148 to 149° C. (Ph. Post.).

A NEW ANTIPYRETIC AND ANALGESIC is prepared by a reaction between para-phenetidin and furfural in the following manner: One equivalent of para-phenetidin and $\frac{1}{2}$ equivalent of furfural are slowly heated together in an oilbath to 111° C, which causes a violent reaction with elimination of water. After removal of the water the mixture forms a thick crystalline mass. This is washed with alcohol and crystallized from ether. The product is in large yellow plates, which melt at 72° to 73° C. They are insoluble in water, and easily soluble in alcohol, ether and benzol. The compound has valuable antipyretic and analgesic properties. (Chem. Ind.).

BEHRING'S TUBERCULAR SERUM.—Behring reported at the Congress at Madrid that the tubercle anti-toxin obtained by him first from mannalla is very injurious to the human system, which precludes its employment. Further investigations of the subject showed that the fault did not lie with the anti-toxin as such, but with the serum per se, as also serum of healthy animals and diphtheria serum produced the same disturbances with tuberculous patients. On the other hand, he succeeded in obtaining a suitable serum by the immunization of certain birds. This new anti-toxin does not differ in its essential character from Koch's Tuberculin, but principally in strength. (Berl. Klin. Wochsch., through Ap. Ztg.).

DIALYSATA GOLAZ.—A Swiss firm, Golaz & Cie., has placed on the market a new class of galenical preparations, which are called dialysates. They are liquid plant extracts, that are not obtained by the customary extraction and percolation processes, but by a new dialysis method, the details of which are not given. Fresh plants are used whenever possible, and are worked up immediately after collection. All solvents and reagents that could possibly bring about molecular changes in the plant constituents are avoided. The dialysates are of the strength of our official fluid extracts, one part of product representing one part of the drug. Wherever possible, especially in the cases of narcotic drugs, the extracts are standardized to a fixed percentage of active constituents, by chemical and by pharmacodynamic methods. The dialysis process extracts alkaloids, glucosides, ethereal oils, tannins and certain ferments related to albumin. In addition to simple dialysates, preparations corresponding to compound powders and fluid extracts are offered. (Südd. Ap. Ztg.).

GLYCOFORMAL.—Walter & Schlossmann (Jour. Pract. Chem.) have made critical tests of the efficiency of various methods of disinfection, and arrive at the conclusion that formaldehyde, in presence of a sufficient quantity of water, deserves preference over all other disinfecting agents. They regard vaporization of para-formaldehyde as inefficient, because of the absence of sufficient moisture and the rapid reconversion of the vapors into para-formaldehyde. A rational and practical disinfection requires that it takes place rapidly, that the disinfectant thoroughly penetrates the objects under treatment and does not injure them. These requirements are met, according to the authors, by a liquid which they name Glycoformal, when it is applied in sufficient quantity by means of a specially constructed atomizer. Glycoformal is a mixture of an aqueous solution of formaldehyde and glycerin. The glycerin is added for the purpose of attracting moisture and thus rendering every smallest particle of formaldehyde effective. At the same time it acts as a solvent for the layer of fat, which is present almost everywhere. This method of disinfection is successful not only in living rooms, but also in stables, which are rendered sterile in one-half to three hours. (Drog. Ztg.).

THE PHARMACEUTICAL ERA

[WEEKLY]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, MAY 26, 1898.

No. 21.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates:
U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL 775	Soldiers and Sailors from
Prizes in Era Course..... 777	New York Drug Trade;
ERA COURSE IN PHAR-	Chicago Druggists Disc-
MACY 779	uss Stamp Tax; New
Inorganic Chemistry..... 779	England Druggists Pro-
Pharmaceutical Processes. 782	test..... 796
Common Sense Views..... 785	Suspicious Dealer in Bos-
Making Emulsions..... 786	ton; Little Sulphur on
Pharmacy in Australasia. 786	Hand; Phenacetine Cases. 797
Distilled Water..... 788	NEWS LETTERS..... 797
PHARMACY 790	BUSINESS RECORD..... 805
QUESTION BOX..... 792	New Jersey Association.. 806
Anna E. Umland..... 792	ASSOCIATIONS 808
TRADE AND NEWS	COLLEGES 811
DEPARTMENT 793	BOARDS 812
The War Revenue Bill..... 793	OBITUARY 812
End of Fraser & Co.;	STATE OF TRADE..... 813
Ergotacia Co..... 795	MARKET REPORTS..... 814

THE ERA DRUGGISTS DIRECTORY.

NOW READY.

The Sixth Edition of this directory, recently issued, contains nearly 44,000 names, including all branches of the drug trade of the United States, divided about as follows: Retailers (including Canada), 37,000; Wholesalers, 300; Manufacturers, etc., 6,000. The changes in firms or their locations occurring since the issue of the fifth edition, about one year ago, approximates 5,000, a circumstance which has marked in more or less degree previous issues of the book, and one which renders frequent revisions necessary. The possession of the latest edition by those who have correspondence with the drug trade is therefore so much of an economy as to become a necessity.

It is the endeavor to make this list as accurate as possible, and subscribers discovering any errors are requested to call attention to them. Changes in this list are published weekly in the Era, and subscribers to the directory will find The Business Record a convenient means for keeping their lists corrected up to date. The price of the directory is \$5.00 per copy, delivered, and of the Era \$3.00 per year in advance. Address D. O. Haynes & Co., Publishers, Box 1483, New York.

Who Pays the Tax?

As was to be expected, there is very considerable variety of opinion regarding the revenue stamp tax on proprietary medicines. Retail druggists especially are awaking to the importance of this matter, and are expressing much fear that the measure is going to act very seriously to their disadvantage and detriment. Various State and local organizations of druggists have passed resolutions to protest against this or that feature of the bill, these protests being, as a rule, against being obliged to tax goods in stock, and against any provision which shall make it possible for the manufacturers, proprietors and jobbers to saddle the whole amount of the tax upon the retail druggist or his customers. Following is a sample letter:

St. Louis, Mo., May 18, 1898.

I have read very carefully your article, in which you say the consumer will pay the internal revenue levied upon patent medicines. Hood's goods are marked to sell at one dollar. We now retail them at one dollar. What will we get for them should the price be advanced 50c. per dozen? The same applies to all similar preparations. All patent pills that retail for a quarter, will, of course, be advanced from 12c. to 25c. a dozen. Advise me what in your judgment they will retail for.

From the tone of your article, you seem thoroughly convinced that the consumer will pay the price, therefore, you must of necessity feel that we will retail a dollar preparation for \$1.05 and a 25c. preparation for 26c. We must do this if manufacturers increase their prices, or we and not the consumer will pay this revenue.

I would thank you for a little information.

In commenting upon this letter, we would congratulate our correspondent upon his ability to get a dollar for a dollar patent. We were unaware that this was possible in the city (St. Louis) from which he writes. If, however, he is getting full prices, we would advise him to leave well enough alone, for he is immensely more fortunate than the great rank and file of retail druggists, who must sell patent medicines at but very few cents above original cost. Most druggists would be only too glad to get the 37½ cents profit on the dollar article mentioned, or any other, and would not object very seriously to decreasing this profit by the few cents of tax.

But full prices do not prevail everywhere, and it is to the druggists who have for years been selling at cut rates that our former remarks were addressed. At these cut rates proprietaries have been sold upon the very smallest margin, which could not admit of the subtraction of the tax without direct loss. These druggists can and should raise prices sufficiently to cover the tax, and, besides, if possible, add a few cents more. So long as they must ask for something, they should ask for as much as they can get, and we believe that in the majority of cases they can secure

more than the bare advance made necessary by the tax.

Our correspondent's various questions we cannot answer at this time, because the entire matter of the revenue stamp tax is just at present in a very chaotic condition. The bill has been amended and revised out of all recognition. No one yet knows just what will be its final form when passed. It is only known in a general way that goods in stock are not to be taxed until sold, and that the rate of taxation first named will in all probability be materially reduced and apportioned more equitably, so as to apply to articles of low selling price as well as to greater. It seems pretty sure, however, that manufacturers and jobbers will save themselves by either raising prices or making separate charges for the tax, and this, of course, must fall upon the retailer, unless he can in some way get it out of his customers. This is a matter where he must work out his own salvation. If he cannot sell goods at a profit, it has always been our opinion that he is foolish to sell them at all, unless he is willing to consider them as merely advertising expense for his business. We do not see why it is impossible, however, to secure enough advance from the customer to pay the cost of the stamps. It may be explained to the customer as a war necessity. The consumer will get this explanation for increased prices on goods in other lines which he purchases, and there is no valid reason why he should not get it with his patent medicines. In England, where the stamp tax is much higher, there is no particular difficulty in this matter.

The Liquefaction of Hydrogen.

As very briefly announced in this journal a couple of weeks ago, Prof. Dewar, of London, has succeeded in liquefying hydrogen. The announcement then made was the substance of a cable dispatch, and was very brief, with no details. The mail has now brought fuller particulars, which will be read with interest.

There is already a controversy as to where the credit belongs for first bringing into control this last and most fugitive of the elements. The Polish scientist, Olszewski, forestalled the discovery a year or two ago by determining accurately the critical temperature and boiling point of hydrogen, but he did not succeed in reducing the gas to liquid form in a really practical way, so that it could be examined and its properties tested. This has now been done for the first time by Prof. Dewar, and most interesting are the discoveries which are certain to develop from experiments made at the inconceivably low temperature of minus 205° centigrade. This is within twenty or thirty degrees of absolute zero, and is a point or condition in which matter undergoes astonishing changes in all its characteristics.

Prof. Dewar explained his latest researches at a meeting of the Royal Society, and his disclosures were received with extraordinary interest. Two or three years ago Prof. Dewar showed that a jet of hydrogen could be used to cool bodies below the temperature that could be reached by the use of liquid air; but all attempts to collect the liquid in vacuum vessels failed. The type of apparatus used in these experiments worked well, and it was therefore resolved to construct a much larger liquid air plant, and to combine with its circuits and arrangements for the liquefaction of hydrogen. So a start was made with hydrogen, cooled to -205° centigrade, and under a pressure of 180 atmospheres, escaping continuously from the nozzle of a coil of pipe at the rate of about ten or fifteen cubic feet per minute, in a vacuum vessel, double silvered, and of special construction, all surrounded with a space kept below -200° centigrade. Liquid hydrogen began to drop from this vacuum

vessel into another, doubly isolated by being surrounded with a third vacuum vessel. In about five minutes twenty cubic centimeters of liquid hydrogen were collected, when the hydrogen jet froze up from the solidification of air in the pipes. The yield of liquid was about 1 per cent. of the gas. Five gallons were produced in an hour. Hydrogen in the liquid condition is clear and colorless, showing no absorption spectrum, the meniscus being as well defined as in the case of liquid air.

The liquid must, in Prof. Dewar's opinion, have a high refractive index and dispersion, and the density must be in excess of the theoretical density—0.18 to 0.12—which we deduce respectively from the atomic volume of organic compounds and the limited density found by Amagat for hydrogen gas under infinite compression. Prof. Dewar's old experiments on the density of hydrogen in palladium gave a value of 0.62 for the combined body. Not having arrangements at hand to determine the boiling point, he made two experiments to prove the excessively low temperature of the boiling fluid. In the first place, if a long piece of glass tubing, sealed at one end and open to the air at the other, is cooled by immersing the closed end in liquid hydrogen, the tube immediately fills with solid air where it is cooled. The second experiment was made with a tube containing helium—a rare gas which has hitherto resisted all attempts to effect its liquefaction. Two years ago, arguing by analogy of the molecular weights of fluorine and oxygen, Prof. Dewar suggested that the volatility of hydrogen and helium would probably be found close together. A specimen of helium which had been extracted from Bath gas was sealed in a bulb with a narrow tube attached, and was placed in liquid hydrogen, when a distinct liquid was seen to condense. From this result it would appear that there cannot be any great differences in the boiling points of helium and hydrogen.

All known gases have now been condensed into liquids which can be manipulated at their boiling points under atmospheric pressure in suitably arranged vacuum vessels. With hydrogen as a cooling agent, we shall get within 20° or 30° of the zero of absolute temperature. No one can predict the properties of matter under zero of temperature. Faraday liquefied chlorine in the year 1823. Sixty years later Wroblewski and Olszewski produced liquid air, and now, after fifteen years' interval, the remaining gases, hydrogen and helium, appear as static liquids.

Relative Worth of Experience and College Training.

We do not desire to open this vexed question for discussion, but merely to call to attention a recent ruling which definitely establishes in a legal way the relative worth of a college training and of practical experience. At a recent meeting of the Michigan Board of Pharmacy an important and significant change was made in its rules. While this change concerns every aspirant for the certificate of registration, it particularly applies to the college-prepared man. In order to be admitted to examination for a registered pharmacist's certificate, the candidate must have had three years' experience. Heretofore, a year's time in college was doubled in counting up this three years; that is, if the student spent a year and a half in college, it was counted as three years. But in addition to his college work he was required to have had four months' practical work in a retail drug store. Now the ruling is that he must have a year's work in the store, and shall get the credit of a year's work in college for every nine months that he puts in there. Thus it will be seen that he will be eligible for registration when he has spent eighteen months in college

and has had one year's practical work in a drug store. The new rule is to go into effect January 1, 1899.

This requirement does not affect the would-be pharmacist who does not go to college. He must have, as heretofore, full three years' practical work in the store. The Michigan Board, therefore, places a definite value upon college education. That is, it is worth more, counting by months or years, than a store experience.

The board farther will pass upon the colleges whose students may be accepted. Such colleges must have a nine months a year course, with a minimum instruction in pharmacy of ten hours per week of lectures and fifteen hours per week of laboratory work. All the colleges of pharmacy will be notified, in order that if they desire, and if needed, they may change their curricula to meet this demand.

This does not mean that a college diploma will admit any one to registration in Michigan, but merely that it will be accepted as evidence which makes a candidate eligible for examination for registration. The Michigan Board will undoubtedly be criticized more or less severely by some other boards which accept diplomas in lieu of examination, but it has always maintained that it will find out for itself what the candidate knows. We believe the position of the board is a good one, and unassailable. In the present chaotic condition of board requirements in this country and very widely differing courses of instruction given by colleges of pharmacy, it is the height of absurdity to place all on the same plane and accept diplomas at equal value. As things now are, a diploma from one college may represent only one-half, or perhaps twice as much, as that from some other college, and it is unfair to one or the other to accept them both upon equal terms. When all colleges have come up to a proper minimum standard of efficiency, and when all boards have established the desirable minimum requirements, then, and not until then, diplomas should be recognized in lieu of examinations.

Old Revenue Stamps.

A correspondent inquires "whether the old-fashioned revenue stamps will be satisfactory for the incoming war revenue bill? We have a few dollars' worth left over from the old tariff, besides a few goods which have the old stamp upon them. Would these goods require an additional stamp? We quite agree with you as to the injustice of making a dealer stamp his entire stock. We have \$2,500 worth of dead stock, out of \$15,000 worth, and shall destroy much of it as not worth the stamps, if the law should require these stamps to be affixed to all stock."

Since writing, our friend has doubtless learned that in all probability the law will provide that goods in stock need not be stamped until they are sold. Thus, his determination to destroy all his dead stock need not be carried out.

The Collector of Internal Revenue for the Second District of New York City, answering these questions, says that when the old stamp tax act was repealed, a period of two years was allowed for the redemption of unused revenue stamps remaining in the hands of manufacturers of patent medicines, etc. He who failed to take advantage of this period of redemption and return his unused stamps, suffered loss upon them, and the old revenue stamps at the present day are no good to any one, unless it be to stamp collectors and gatherers of souvenirs.

—The plant of the Beeman Chemical Company, manufacturers of chewing gum, Cleveland, O., was destroyed by fire May 5. It was reported the loss will nearly aggregate the amount of the insurance, \$65,000.

ANNUAL AWARD OF PRIZES TO STUDENTS OF THE ERA COURSE IN PHARMACY.

In the following announcement we give a partial list of the prizes to be presented to students of the Era Course at the close of the present Junior year. Other appropriate rewards are being provided for, and will be announced at a later date.

In this connection the Director calls attention to the fact that all students of the course are eligible to the prize contest, whether they have been able to keep pace with the recitations or not. This concession is made in order to afford those who, by reason of illness or other cause, have not been able to keep their recitations up to date, an opportunity of completing the year's work successfully, with a possible chance of securing one of the prizes in addition. As a matter of fact, the records kept by the quiz masters show that there are but comparatively few members of the class who cannot hope by a little extra effort to complete a sufficient number of recitations to justify their advancement to the senior class. The exact date of the examinations will be announced later.

DIVISION OF PRIZES.

The prizes offered are divided into General Prizes, awarded for superior excellence in all subjects, and Special Prizes, awarded for superior excellence in special subjects. By this plan it is hoped to encourage students to compete for special prizes, even though they should feel their chances for one of the general prizes hopeless.

The awarding of the prizes will take place as soon after the close of the junior year as possible, and will be delayed no longer than is necessary for the grading of examination papers and records of recitations.

THE ERA SCHOLARSHIP PRIZE.

Subsequent to the regular examinations, a special examination will be held to determine the recipient of the Era Scholarship Prize. This examination will be sent only to students who are successful in passing the regular examinations with a sufficiently high grade, and who, in addition, make special application to the Director to be admitted to the scholarship contest.

The prize will consist of a complete scholarship in any college or school of pharmacy in the United States or Canada, which may be selected by the student, and include all tuition and incidental fees from matriculation to graduation.

GENERAL PRIZES.

The general prizes are those which are to be awarded for superior excellence in the recitations and examinations in all subjects of the Junior year.

THE ERA JUNIOR SILVER MEDAL.

To the student who shall receive the highest rating in all subjects of the Junior Year, the Pharmaceutical Era will award a handsomely engraved and appropriately inscribed Silver Medal.

THE WHITALL, TATUM & CO. PRESCRIPTION BALANCE.

To the student who shall attain the next highest general average in all subjects of the Junior year, Messrs. Whitall, Tatum & Co., of Philadelphia and New York, will present a fine Prescription Balance in polished mahogany case, with glass folding door and set of metric weights.

PARKE, DAVIS & CO. MATERIA MEDICA CABINET.

To the student attaining the next highest general average in all subjects of the Junior Year, Messrs. Parke, Davis & Co. will present one of their celebrated Student's Cabinet of Materia Medica. The collection embraces a large number of typical specimens of medicinal drugs in handsome glass-topped boxes, the whole contained in a convenient polished oak case. This is perhaps the finest student's cabinet of drugs ever prepared, and constitutes a prize well worth striving for.

THE LIPPINCOTT "PHARMACIST'S LIBRARY."

To the student attaining the next highest general average in all subjects of the Junior Year, the J. E.

Lippincott Company will present their handsome and valuable Pharmacist's Library, consisting of one copy each of the United States Dispensatory, Remington's Theory and Practice of Pharmacy, Lippincott's Medical Dictionary and Sadtler & Trimble's Pharmaceutical and Medical Chemistry, a collection of works by the highest pharmaceutical authorities, and constituting a complete working library for the pharmacist.

THE HENRY TROEMNER PRESCRIPTION SCALE.

To the student attaining the next highest general average in all subjects of the Junior Year, Henry Troemner, of Philadelphia, will present one of his celebrated Famous Prescription Scales, No. 12.

MEDICAL DICTIONARY.

To the student attaining the next highest general average in all subjects of the Junior Year, the publishers will present a copy of Lippincott's Medical Dictionary, the most valuable work of the kind published.

REMINGTON'S THEORY AND PRACTICE OF PHARMACY.

To the student attaining the next highest general average in all subjects of the Junior Year will be presented by the publishers a copy of Remington's Theory and Practice of Pharmacy.

SADTLER & TRIMBLE'S PHARMACEUTICAL AND MEDICAL CHEMISTRY.

To the student attaining the next highest general average in all subjects of the Junior Year, the publishers will present a copy of Sadtler & Trimble's Pharmaceutical Chemistry.

THE ERA FORMULARY.

To the student attaining the next highest average rating in all subjects of the Junior Year, the Pharmaceutical Era will present one copy of the celebrated Era Formulary.

POTTER'S MATERIA MEDICA AND THERAPEUTICS.

To the student attaining the next highest average rating in all subjects, Messrs. P. Blakiston, Son & Co., of Philadelphia, will present a copy of Potter's Materia Medica and Therapeutics, a handsome and valuable work.

UNITED STATES PHARMACOPOEIA.

To each of the two students who shall attain the next highest ratings in all subjects will be presented a copy of the United States Pharmacopoeia, one copy to be presented by the Pharmaceutical Era and the other by the J. B. Lippincott Company.

THE PHARMACIST AT WORK.

To each of the five students who shall attain the next highest average rating in all subjects the publishers will present a copy of the popular book by William C. Alpers, entitled, "The Pharmacist at Work."

SPECIAL PRIZES.

THE WARNER GOLD MEDAL

To the student attaining the highest rating in the subject of Pharmaceutical Processes, William R. Warner & Company will present an elegantly engraved gold medal, inscribed with the names of the recipient and donor, and the cause for which the medal was awarded.

THE LEHN & FINK HERBARIUM OF MEDICINAL PLANTS.

An elegant collection of about five hundred herbarium specimens of important medicinal plants, handsomely preserved and mounted, and correctly classified and labeled. To be awarded by Lehn & Fink, New York, for superior excellence in the subject of Botany.

REMINGTON'S THEORY AND PRACTICE OF PHARMACY.

A copy of the latest edition of this splendid work upon the Theory and Practice of Pharmacy, bound in library sheep, with a presentation note by the author, Prof. Joseph P. Remington, will be presented to the student receiving the highest marks in the subject of Pharmaceutical Physics.

SADTLER & TRIMBLE'S PHARMACEUTICAL AND MEDICAL CHEMISTRY.

One copy of this excellent and authoritative work on Chemistry will be presented by Prof. Sadtler, to the student who shall receive the highest rating in Inorganic Chemistry.

UNITED STATES DISPENSATORY.

To the student attaining the highest rating in the

subject of Microscopy, the J. B. Lippincott Company will present a copy of the latest edition of the United States Dispensatory, the world's greatest authority on Pharmaceutical Materia Medica.

CONDITIONS GOVERNING THE AWARD OF PRIZES.

The conditions upon which the above prizes will be awarded are as follows:

- 1.—Every student of the Era Course will be considered a contestant for a prize, unless he expressly advise us to the contrary.
 - 2.—The ratings will be taken from the quiz master's official records, on file in the office of the Director, and from the examination papers hereafter received from students.
 - 3.—In determining the general average ratings, the first and most important factor will be the accuracy and excellence of the answers to the questions which are sent out.
 - 4.—In the event that two or more students shall receive the same rating as determined by the preceding rules, then the following additional factors shall be taken into consideration in order to determine which shall be entitled to precedence: Spelling, composition and correct use of English, penmanship and use of capitals.
- In connection with the prizes which are to be bestowed, there will be published in the Pharmaceutical Era and the Prospectus of the Era Course in Pharmacy, a special list of the names of students whose work for the year entitles them to HONORABLE MENTION.

The publication of the prizes to be awarded to students of the Senior class, among which are several gold and silver medals, will be deferred until next year.

All correspondence relating to prizes and examinations should be addressed to the Director.

J. H. BEAL, Seco, Ohio.

Director of the Era Course in Pharmacy.

Fraser & Co. Squelched.

As reported in our news columns this week, one of the numerous swindlers who have been preying upon the drug trade by the fraudulent mail order scheme has at last been hard squeezed, and it is probable that he will not again attempt to carry on this sort of trading. It is a rather sad commentary upon methods of doing business prevailing in the drug trade that such thieves as Fraser & Co. can make their schemes succeed. It would seem that common business precaution would lead a manufacturer to look up the financial responsibility of a new customer. Many of these swindlers' victims accept their orders without question, in their desire to sell goods, and there are not a few cases where a firm being defrauded once has fallen the victim of two or three others of the gang in succession, which proves that "the burnt child dreads the fire" is not true in all cases. Sympathy for the victims is in many instances misplaced, because their sufferings have been due to their own lack of precaution and common sense.

The most objectionable feature of the schemes worked by these swindlers is that they assume names identical with or very similar to those of reputable houses of good standing, and in this way very great annoyance is worked to the latter. It is to be regretted that the United States officers are moved by any plea to discontinue their prosecutions of these frauds. The authorities have been altogether too lax in the matter, have refused to proceed upon the most unquestioned straightforward evidence, and the gang in New York has taken advantage of this fact and played the game to the limit. However, Fraser is now squeezed, and the others are a little more cautious. Perhaps the time will come when Crosher and his pals will find themselves in jail.

The Boston individual mentioned elsewhere in this number is called to the attention of the trade. His methods seem to be similar to those of the New York fraternity, and possibly he is one of them masquerading under a new title. We can only repeat and keep repeating to the trade the advice to look upon this class of business with suspicion, and accept it only on a cash basis, or not until the references are systematically investigated and found to be reliable.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblenz, A.M., Ph. M., Ph.D., F.C.S.	Oscar Oldberg, Phar.D.
Wilbur G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Phm. E., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George E. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M. D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college, for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in **THE PHARMACEUTICAL ERA**, and the **QUIZZES** and **EXAMINATIONS** are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and **DIPLOMAS** are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 27, 1898; the second term began February 17, 1898, and will end June 30, 1898. The junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum, and includes subscription to the **ERA**, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 73.

Inorganic Chemistry.

Iron. Cobalt. Nickel.

These three elements constitute a subdivision of the eighth group of the periodic classification. The group is connected on the one side with chromium and manganese by the similarity of the ferrates to the chromates and manganates, and on the other side to copper by the similarity of the compounds of nickel to those of the last-named element.

IRON.

Symbol Fe. Valence 2 and 3. Atomic Weight, 55.85. Specific Gravity, 7.5

Historical.—Owing to the readiness with which the metal is destroyed by oxidation, articles of iron are not found among the remains of the most ancient civilization, like gold, silver, and other more permanent materials. It is tolerably certain, however, that the metal was extracted from its ores and worked into arms and implements centuries before the Christian Era. Abundant evidence of its use in ancient India, Egypt and Assyria is found in the fragments of history which have come down from those nations or which may be obtained from existing monuments.

The English name of the metal is from the Anglo-Saxon "iren," identical with the Scandinavian "iern," and related to the German "eisen." The symbol is from the Latin name "ferrum."

Natural Occurrence.—Native iron occurs in small spicules distributed through certain basaltic rocks, and in meteorites. In the latter it is associated with cobalt, nickel, copper and other substances. The ores and minerals containing iron are numerous and abundant, nearly all soils and rocks containing it. From the soil it is absorbed by plants, and from these passes into the animal economy. It is an essential constituent of chlorophyll, the coloring matter of plants, and of hæmoglobin, the coloring matter of the blood. The principal natural compounds are as follows: the sulfids, including iron pyrites, FeS, and the ferrous and ferric sulfids, FeS, and Fe₂S₃.

Siderite, or ferrous carbonate, FeCO₃, known as spathic iron; Hematite, or specular iron ore, or ferric oxid, Fe₂O₃; Magnetite, the lodestone of the ancients, or ferrous-ferric oxid, Fe₃O₄.

A hydrated form of ferric oxid, known as limonite, etc. In addition to the foregoing the metal is a constituent

of many silicates, and in the form of the hydrated oxid imparts a yellow or reddish color to clay.

Preparation.—Iron is prepared from its ores, preferably some form of the oxid, by heating them in a blast furnace mixed with carbon as coal, coke or charcoal, and limestone. The reaction is supposed to be accomplished by the carbon monoxid produced from the fuel abstracting oxygen from the ore and passing out of the furnace stack as carbon dioxide, while the melted iron accumulates at the bottom and is drawn off from time to time. The purpose of the added limestone is to form an easily fusible slag with the silica and other impurities of the ore.

Prepared by the preceding method the iron always contains impurities, as carbon, silica, sulfur, phosphorus, etc.

Description and Physical Properties.—The physical character of a specimen of iron depends largely upon the proportion of other elements present, and especially upon the percent of carbon. As it comes from the blast furnace it is known as "cast" or "pig" iron, and contains from 2.5 to 6.0 per cent., or more, of carbon. In "white cast iron" the carbon is chemically combined, in "gray cast iron," a portion of the carbon is present in the form of graphite, and hence darkens the color. When cast iron is dissolved in hydrochloric acid, the combined carbon passes off as gaseous hydrocarbons, while the graphite remains behind in the solid state. Cast iron is brittle, not malleable or ductile, breaks with a granular fracture, and is more fusible than the other forms of the metal.

Wrought iron is iron deprived of the impurities present in cast iron, and containing not more than 0.3 per cent. of carbon. It is produced by melting cast iron in contact with ferric oxid, by means of which the carbon, silicon, phosphorus, etc., are converted to oxids, which either pass off as gases, or combine with the ferric oxid to form a slag, leaving nearly pure iron behind. Wrought iron is malleable, ductile, possesses great tenacity, and breaks with a fibrous fracture. Its melting point is much higher than that of cast iron.

Steel is an intermediate product containing more than 0.3 per cent. of carbon, but less than cast iron. It may be manufactured by burning the excess of carbon out of molten cast iron, as in the Bessemer process, or by adding carbon to molten wrought iron, as in the manufacture of "crucible steel."

Steel differs from cast iron in the fact that it can be tempered to any degree of hardness or elasticity. When heated and plunged into cold water it becomes very hard and brittle. By carefully regulating the temperature at which it is cooled, it becomes highly elastic, or is said to be "tempered."

Chemically pure iron is prepared from its chemically pure compounds by heating them in a current of hydrogen. On polished surfaces it is white or bluish white, has a specific gravity of 7.8, and fuses in the neighborhood of 1600° C.

All the forms of iron, as well as its natural compound the lodestone, are remarkable for their property of attracting and being attracted by the magnet. Soft iron loses its magnetism when withdrawn from the inducing magnet or current, while steel once magnetized retains its magnetism indefinitely.

Chemical Properties.—Iron is not affected in dry, pure air, but in the presence of moisture quickly oxidizes or rusts, forming the reddish ferric oxide. Dilute sulfuric and hydrochloric acids dissolve it, forming ferrous salts, and releasing hydrogen. Dilute, cold nitric acid dissolves it slowly, forming ferrous nitrate and ammonium nitrate. If the acid be moderately concentrated, or if the reaction takes place at an elevated temperature ferric nitrate is produced, and nitric oxide evolved. If dipped directly into concentrated nitric acid, the metal becomes passive, in which condition it is no longer subject to the corroding effect of acids or other agents. This condition is thought to be due to the formation on the surface of oxide, which protects the metal from further oxidation.

The tendency of iron to oxidation in air or water is increased by the presence of ammonium salts and organic compounds, and is diminished by the presence of the fixed alkalis.

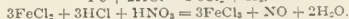
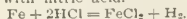
COMPOUNDS.

The most important compounds of iron are the ferrous and ferric salts. The former are instable, especially in solution, and rapidly pass into the latter by oxidation. The ferrous salts are mostly greenish, the ferric salts yellow to brown red. When entirely deprived of their water of crystallization ferrous salts may appear white.

Halogen Compounds.—Iron and its oxides readily combine with the halogens to form either ferrous or ferric compounds.

Ferrous iodide, FeI_2 , is formed when iron in the form of filings or wire is brought into contact with iodine under water. A solution made in this way and sweetened with sugar constitutes the Syrupus Ferri Iodidi of the Pharmacopœia, or when mixed with sugar and evaporated to dryness the official Ferri Iodidum Saccharatum.

Ferric chloride, FeCl_3 (or Fe_2Cl_6) is prepared by dissolving iron in hydrochloric acid and oxidizing the resulting ferrous chloride with nitric acid.



When evaporated to dryness it forms a yellowish, crystalline, deliquescent mass.

A solution containing 37.8 per cent. of the salt is official as Liquor Ferri Chloridi. This solution mixed with three times its volume of alcohol forms the official Tinctura Ferri Chloridi.

Oxygen Compounds.—Iron forms two well marked basic oxides, ferrous and ferric, and a ferrous-ferric oxide which is probably a compound of the two together.

Ferrous sulfate crystallizes in large, pale, bluish black powder by the partial reduction of ferric oxide in a current of hydrogen. The corresponding ferrous hydroxide, $\text{Fe}(\text{OH})_2$, is produced when a ferrous solution is precipitated by an alkaline hydroxide in the absence of oxygen. Both the oxide and hydroxide rapidly absorb oxygen and pass into the ferric state.

Ferric oxide, or iron sesquioxide, Fe_2O_3 , occurs naturally as the mineral hematite, and is formed when iron rusts or when ferrous oxide absorbs oxygen, or when ferric hydroxide or ferric salts of volatile acids are ignited. It is a steel gray, brown or red powder. The finer qualities are used as a paint for iron work, and as rouge for polishing jewelry.

Ferric hydroxide, $\text{Fe}(\text{OH})_3$ (or $\text{Fe}_2(\text{OH})_6$) is produced as a brown red magma by precipitating a solution of a ferric salt with an alkaline hydroxide. It is employed in phar-

macy in the preparation of the scale salts and other compounds of iron, and in medicine as an antidote for acute arsenical poisoning. When employed for this last purpose it should be freshly prepared and liberally administered.

Ferrous-ferric, or magnetic oxide of iron, Fe_3O_4 , occurs naturally as the mineral magnetite, and can be prepared by heating iron to a red heat in the air, burning it in oxygen, or subjecting the metal to the action of superheated steam. It is in the form of steel gray or black, shining scales or crystals, and is either magnetic or attracted by the magnet.

Sulfur Compounds.—The monosulfide, or ordinary ferrous sulfide, FeS , is prepared by mixing iron with molten sulfur when the two elements readily unite. It is well known as a laboratory reagent, employed in the generation of hydrogen sulfide.

The native sulfide of iron, or fool's gold, iron disulfide, FeS_2 , is well known as the hard, shining, brass-yellow, iron pyrites.

A sesquisulfide and several other forms are also known.

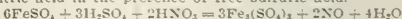
Salts of the oxygen Acids.—The most important of the iron salts of the oxygen acids are the ferrous and ferric sulfates, and ferric nitrate.

Ferrous sulfate, or green vitriol, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, may be prepared by dissolving scrap iron in dilute sulfuric acid, or by the oxidation of the iron pyrites or "coppers" found in coal seams. On exposure to air and moisture the sulfur of the pyrites is oxidized to sulfuric acid, which then combines with the iron present. The ferrous sulfate is then leached out, the excess of acid neutralized by scrap iron, and the solution evaporated until the salt crystallizes out. As thus prepared the compound always contains impurities derived from the pyrites and the crude iron employed. The impure salt is known and sold commercially as coppers. If a pure salt is desired it must be prepared from the pure metal and acid.

Ferrous sulfate crystallizes in large, pale, bluish green monoclinic prisms. In dry air it loses water of crystallization and falls to powder. In moist air it absorbs oxygen, forming a coating of rust-colored basic ferric sulfate. Other forms of crystals are known containing less than seven molecules of water, the amount depending upon the particular circumstances attending the crystallization.

With the sulfates of the alkalies, ferrous sulfate combines to form stable double salts. Ammonio-ferrous sulfate, $(\text{NH}_4)_2\text{SO}_4 \cdot \text{FeSO}_4 \cdot 6\text{H}_2\text{O}$, is an example, and can be prepared by dissolving ferrous and ammonium sulfates in molecular proportions and crystallizing. Owing to the fact that it is less readily oxidized than ferrous sulfate it is frequently used as a reagent in place of the latter compound.

Ferric sulfate, $\text{Fe}_2(\text{SO}_4)_3$, is usually seen in the form of a dark brown solution, as in the official Liquor Ferri Tersulphatis, prepared by oxidizing ferrous sulfate with nitric acid in the presence of free sulfuric acid.



Its principal use is in the preparation of ferric hydroxide to be used as the source of other iron compounds, or as an antidote to arsenic.

Should the sulfuric acid be present in less amount than to make the normal salt, a solution of basic salt is formed, official under the title of Liquor Ferri Subsulphatis, or Monsel's Solution, used as a styptic.

Ferric sulfate, like other sulfates of trivalent metals previously described, has the property of crystallizing with sulfates of the alkali metals to form alums, usually of violet or purple colors, and containing 24 molecules of water, of which the official Ferri et Ammonii Sulphas, $(\text{NH}_4)_2\text{Fe}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$, is an example.

Ferric Nitrate, $\text{Fe}(\text{NO}_3)_3$ or $\text{Fe}_2(\text{NO}_3)_6$, can be prepared by dissolving either metallic iron or ferric hydroxide in nitric acid. It forms nearly colorless cubes or monoclinic crystals, the form depending upon the number of water molecules. The official Liquor Ferri Nitratis is a yellow or brownish red liquid made by dissolving ferric hydroxide in nitric acid.

Ferric acetate, $\text{Fe}(\text{C}_2\text{H}_3\text{O}_2)_3$ or $\text{Fe}_2(\text{C}_2\text{H}_3\text{O}_2)_6$, is official in Liquor Ferri Acetatis, prepared by dissolving ferric hydroxide in glacial acetic acid, and diluting to the proper strength. It is a dark reddish brown liquid, instable, and on standing or boiling throws down a brown-red precipitate of basic ferric acetate, $\text{Fe}_2(\text{OH})_2(\text{C}_2\text{H}_3\text{O}_2)_4$.

A large number of other iron salts of the oxygen acids are known and used in chemistry and the arts, for particulars of which the more complete works on chemistry can be consulted by the student.

Cyanogen Compounds.—With cyanogen, iron forms several compounds of particular interest, which are of the nature of double cyanids. For example, when metallic iron or one of its oxids is dissolved in solution of potassium cyanid, it is possible to obtain from the solution yellow crystals known as potassium ferrocyanid, having the composition $K_4Fe(CN)_6$ or $4KCN.Fe(CN)_2$, the latter formula showing that it may be regarded as a double salt consisting of four molecules of potassium cyanid combined with one of ferrous cyanid.

By treating a strong solution of the salt with concentrated hydrochloric acid a white crystalline powder separates out, of the composition $H_4Fe(CN)_6$, and is therefore ferrocyanic or hydroferrocyanic acid.

When a solution of potassium ferrocyanid is treated with chlorine gas, the iron of the ferrocyanogen is oxidized to the ferric state, and potassium ferricyanid, $K_3Fe(CN)_6$, is produced.



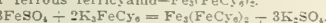
This last compound may be regarded as consisting of the union of three molecules of potassium cyanid, with one of ferric cyanid, as appears when the formula is written $3KCN.Fe(CN)_3$.

By treating its solution with concentrated acids, ferricyanid or hydroferricyanid acid is obtained.

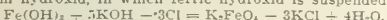
In addition to the peculiarities of their constitution, ferro and ferricyanid acids are remarkable for the number of insoluble and bright colored compounds which they form with the metals. The compound formed by precipitating a ferric salt with a soluble ferrocyanid is known as Prussian blue, and has the composition $Fe_3(CN)_6$.



When a ferrous salt is treated with a ferricyanid, a second blue precipitate is formed, known as Turnbull's blue, or ferrous ferricyanid— $Fe_2(FeCy)_2$.



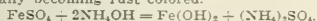
Ferric Acid, H_2FeO_4 .—Ferric acid is not known in the free state, but its salts, the ferrates, can be produced by passing chlorine gas into a solution of potassium hydroxid, in which ferric hydroxid is suspended.



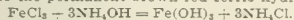
The solution has a violet color, and is instable. On standing it evolves oxygen and yields a precipitate of ferric hydroxid. It is of importance only as showing the relation of iron to chromium and manganese by its similarity to the manganates and chromates.

Characteristic Reactions.—The salts of iron and the distinctions between ferrous and ferric compounds are shown mainly by their reactions with the alkaline hydroxids, ferrocyanids, ferricyanids and thiocyanates.

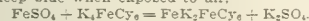
Ferrous salts with an alkali hydroxid yield a dirty white or gray precipitate of ferrous hydroxid, gradually changing to black when it comes in contact with the air, and finally becoming rust colored.



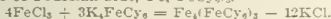
Ferric salts with an alkaline hydroxid yield a precipitate of the permanent brown-red ferric hydroxid,—



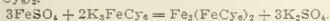
Ferrous salts with ferrocyanids yield a bluish-white precipitate of Everett's salt, $K_4FeFeCy_6$, gradually becoming deep blue when exposed to air.—



Ferric salts with a ferrocyanid yield a deep blue precipitate of Prussian blue, $Fe_3(FeCy_6)_2$.



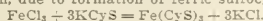
Ferrous salts with ferricyanids yield a dark blue precipitate of ferrous ferricyanid or Turnbull's blue, $Fe_2(FeCy)_2$.



Ferric salts with ferricyanids form a greenish or brownish liquid, but do not yield a precipitate unless some ferrous salt be present.

Ferrous salts containing no ferric salt with a sulfo-cyanate give no reaction.

Ferric salts with a sulfo-cyanate yield an intense blood red solution, due to formation of ferric sulfo-cyanate,—



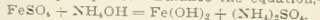
All compounds of iron color the borax bead reddish

when hot, yellowish when cold. With a strong reducing flame, the bead may become greenish from reduction of the iron to the ferrous condition. In all cases, the bead will have but little color unless strongly saturated.

PRACTICAL STUDIES.

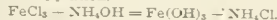
1.—Select some clean crystals of ferrous sulfate, free from rusty patches, and dissolve in distilled or recently boiled water, first rinsing the crystals with a portion of the water. Use this as the ferrous solution in the following experiments. The solution must be used while fresh.

2.—To a portion of the ferrous solution add some ammonium hydroxid. Note the character of the precipitate both while fresh, and after standing for some time. Explain the reason for the difference in the appearance at the top of the precipitate. Balance the equation,—



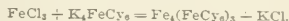
3.—Repeat the last experiment in all particulars, but using a solution of ferric chlorid or other ferric salt instead of ferrous salt. Note carefully the character of the precipitate, and compare with the last. What are the pharmaceutical and medicinal uses of this precipitate?

Balance the equation,—

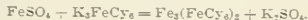


4.—To solution of ferrous salt add solution of potassium ferrocyanid. What is the precipitate produced? Compare with the next experiment.

5.—Repeat the last experiment, but using a ferric salt instead of ferrous sulfate. What is produced in this case? Compare with the last precipitate. Balance the equation,—



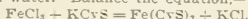
6.—To solution of ferrous salt add freshly prepared solution of potassium ferricyanid, and note the result. Reserve and compare with the next. Balance the equation,—



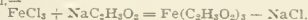
7.—Repeat the last experiment, using a ferric instead of a ferrous salt. What occurs? Compare the two reactions.

8.—To solution of a ferrous salt add solution of potassium sulfo-cyanate. Compare the result with the next.

9.—Repeat the last experiment, using a ferric instead of a ferrous salt. What is the result? Dilute the solution largely with water. Balance the equation,—



10.—To solution of ferric chlorid add solution of sodium or potassium acetate, and note the reaction. Balance the equation,—



Boil the solution sharply for a few moments and observe the result.

11.—Prepare a borax bead in the usual manner, dip into an iron salt and heat in the oxidizing flame with the aid of the blow-pipe until transparent. Repeat the dipping and heating until definite results are obtained. Observe the color of the bead both hot and cold, then heat strongly in the reducing flame, and note the effect.

MARKING INKS.—In Ph. Ztg. the following formulas are given: Black Ink—(1) Copper sulphate 35 p., silver nitrate 15 p., ammonia water 50 p., cream of tartar 10 p., dextrin 10 p., sugar 5 p., soda 10 p., lamplack 1 p., distilled water 80 p. The copper sulphate is dissolved in the ammonia water and then the silver nitrate added. The soda, dextrin and cream of tartar are dissolved in the water and the two solutions mixed. The lamplack is first stirred up with a little water and then added to the mixture. (2) Ammonia water 10 p., silver nitrate 5 p., soda 5 p., gum arabic 5 p., distilled water 72 p. Dissolve the silver nitrate in the ammonia water, add the soda and the gum, and finally the water. Let the liquid stand one hour in a warm place and draw it off into small bottles. Red Ink.—Rub together a mixture of eosin, water and sodium silicate. (Drog. Ztg.).

ALPHA-NAPHTHOL.—The therapeutic value of this compound, as compared with beta-naphthol, is being more and more recognized. Its lesser toxicity and much greater antiseptic power make it more generally applicable than the latter. It is used externally in 10 to 20 per cent. solution, in alcohol or oils. Internally it is very useful in chronic diarrhoea and dysentery, in the form "oleum ricini naphtholatum." Maximowitsch recommends it in abdominal typhus, in doses of about 3 gm. (45 grains) daily, best combined with phenacetin, sodium salicylate or quinine. (Ap. Ztg.).

LECTURE No. 72.

Pharmaceutical Processes.

Combustion. Fuels and Fuel Values.

Sources of Heat.—The sources of heat commonly available for pharmaceutical use are the Heat of Combustion, the Heat of the Electric Current, and the Heat derived from the Liquefaction or Condensation of Steam. The latter two are usually derived from the first, since the electric current is generally created by means of the steam engine, and the steam is formed by the combustion of fuel.

The direct heat of the sun is also made use of by the pharmacist when he avails himself of the summer temperature in the drying of crude drugs, the evaporation of easily volatile liquids, etc. The interior heat of the earth is at present but slightly used, except in those rare cases, as in the lagoons of Tuscany, where the steam issuing from crevices of the earth is employed in evaporating the naturally occurring solution of boric acid, etc.

Electrical Generation of Heat.—Electrical appliances for the generation of heat have as yet but a limited application in pharmacy, owing to the fact that the electric current is not always available, and also because of the expense involved in its use. A warming plate heated by the electric current may be utilized where an easily regulated supply of heat is desired for small operations, as in the heating of liquids yielding vapors liable to ignition by direct contact with flame, etc.

Nature of Combustion.—The heat employed in pharmaceutical operations is usually generated by combustion, which is in its nature a chemical reaction, or rather a series of reactions, and consists essentially in the combination of the oxygen of the atmosphere with the oxidizable elements of the fuel. Strictly speaking, any chemical reaction accompanied by the evolution of light and heat is combustion, though it is usual to restrict the term to such as are oxidations.

The principal oxidizable elements of ordinary fuels are carbon and hydrogen, and the main products of combustion are water and carbon dioxide. Another combustible element frequently present, especially in coal, is sulfur, but the product of its combustion, sulfur dioxide, is so offensive and injurious that it is to be regarded as an undesirable impurity rather than as a legitimate fuel constituent.

Calorific Power of Fuels.—The quantity of the heat produced by the combustion of a substance is called its Calorific Power, and is measured by the number of heat units which it is able to release.

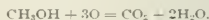
Elements vary greatly in their calorific power or in the amount of heat which is generated or released when they combine with oxygen. The greatest calorific power is possessed by hydrogen. One kilogram of this gas will, when burned in oxygen, release 34,462 calories or thermal units, i. e., will generate sufficient heat to raise that number of kilograms of water from 0° C. to 1° C. A kilogram of carbon, burned in oxygen, will release 8080 thermal units, and so on.

It might be assumed from the above statements that the heat-giving power of a fuel would be equal to the sum of the heat-giving powers of its constituents, but that this is not the case will appear from the following considerations: While most fuels consist largely of carbon and hydrogen, many of them contain a certain percentage of combined oxygen, so that the heat derived from its combustion is diminished by the partial oxidation which it has already undergone. For example, in common alcohol, which has the composition C_2H_5O , the hydrogen is already partially oxidized and hence when burned cannot combine with as much oxygen as it otherwise would have done. Also the products of combustion absorb and carry away a considerable quantity of the heat set free by the reaction. Each kilogram of water formed requires and uses 537 heat units to convert it into steam, in which condition it escapes from the furnace into the atmosphere.

To calculate the calorific power of a fuel, therefore, we proceed in the following manner: (1) Estimate the

amount of carbon and hydrogen in one kilogram of the fuel, considering any oxygen which may be present to be combined with hydrogen. (2) Multiply the amount of carbon and the amount of uncombined hydrogen by their respective calorific powers. (3) From the sum of these products subtract the quantity of heat which will be absorbed and carried away by the products of combustion. The remainder will represent the amount of heat to be obtained from the fuel.

Let it be required to estimate the calorific power of one kilogram of Wood Alcohol, formula CH_3OH . One kilo contains 375 Gm. carbon, 125 Gm. hydrogen, and 500 Gm. oxygen. When combustion occurs, the carbon combines with oxygen to form carbon dioxide, and the hydrogen combines with the same element to form water, thus,—



From an inspection of the equation it will be observed that one half, or 62.5 Gm., of the hydrogen present is already combined with oxygen, so that only 62.5 Gm. is available for combustion. The number of heat units released by the carbon will be equal to $\frac{375 \times 8080}{1000} = 3030$.

The number of heat units released by the hydrogen will be equal to $\frac{62.5 \times 34,462}{1000} = 2154$. The sum of the heat units

released by both is 5184. The amount of water produced in the reaction is found by the usual calculations to be 1125 grams. Since one thousand grams of water require for vaporization 537 heat units, 1125 grams will require 604 heat units. $1,000 : 537 :: 1125 : x = 604$. Subtracting the 604 units absorbed from the 5184 units produced, there remain 4580 heat units as the net quantity of heat theoretically obtainable from one kilo of wood alcohol, or sufficient to raise the temperature of 4580 kilograms of water one degree centigrade.

The actual results are always very much below the theoretical or calculated results.

Igniting Point.—All combustible substances require to be raised to a particular temperature before they will ignite, or begin to burn. This temperature is known as the igniting point or temperature of ignition, and is invariable for the same substance under the same conditions. A lump of phosphorus may be sufficiently heated by a warmed lead pencil to ignite, vapor of carbon disulfide by a warmed glass rod, while a splinter of wood requires the temperature of a flame. Soft coals ignite readily with few precautions, while anthracite coals require care and a moderately high temperature to start their combustion. These instances are but particular illustrations of the close relations of chemical and thermal energy, as it has been proved that the presence of a certain amount of heat is necessary to chemical action of every kind. Even such chemically active substances as potassium and sulfuric acid will not combine if brought together at temperatures below $-150^\circ C.$, nor will any reaction take place until the temperature is permitted to rise.

Conditions of Combustion.—In addition to the requisite of a sufficiently high temperature to start the process, the essentials for good combustion are a liberal, continuous supply of oxygen, and a sufficiently rapid removal of the products of combustion. A sufficient supply of oxygen is secured by an open structure of the fuel mass, permitting ready access of air to all parts of the fuel, and an abundant space for its entrance below and for its escape at the top when its oxygen has been exhausted, and it has become charged with the gaseous products of combustion. The air should be drawn through the mass, thus bringing it into the most intimate contact with the fuel. Conditions which retard combustion are a dense structure of the fuel, insufficient supply of air, and deficient space for the escape of the products of combustion, all of which defects are generally comprehended under the term "insufficient draft."

The color of the flame is a criterion of the thorough-

ness or perfection of the combustion. A blue or nearly colorless flame is, in general, the sign of a high temperature and is secured by a bountiful supply of air and complete combustion. A bright yellow or luminous flame is an indication of a deficient air supply and consequent incomplete combustion. Such flames are not of very high temperature, and deposit soot upon articles with which they come in contact.

FUELS.

The principal fuels are mixtures of carbon and hydrogen and compounds of these elements, together with a few other substances whose presence is generally to be regarded as accidental, as they are not the effective constituents, and are frequently undesirable and detract from the calorific value of the material.

Fuels occur in three forms, solid, liquid, and gaseous, and may exist ready formed in nature or to be artificially prepared. They may be of mineral, animal, or vegetable origin. The principal solid fuels are Wood, Charcoal, Coal, and Coke.

Wood is not now much used as a source of heat in pharmaceutical operations, but has been in the past one of the most important and generally used of fuels. The woody structure of plants consists mainly of cellulose, whose chemical composition is approximately represented by the empirical formula $C_6H_{10}O_5$. Along with the cellulose which forms the framework of the cells there may be other products of plant life stored in the cells, such as water, resins, oils, gums, mineral constituents, etc.

When wood is used for fuel the organic constituents are consumed and pass off as gaseous products, while the inorganic or mineral constituents of the wood remain behind as ash. The visible products of the combustion are smoke, consisting mainly of unconsumed portions of the carbon which is deposited as soot, and partially condensed water vapor. Along with these are commingled the invisible products of the combustion, as condensed water vapor, carbon dioxide, etc. To vaporize these substances requires a large amount of the heat set free from the combustion of the fuel. For this reason, and to get rid of the deposit of soot, it is sometimes advisable to drive off the volatile constituents as much as possible before using as fuel, and use the wood in the form of charcoal.

Charcoal.—Charcoal consists mainly of the non-volatile carbon of the wood, along with the mineral constituents. Charcoal is usually made in regions where wood is abundant and cheap by arranging it in circular piles or stacks which are then covered with a thick layer of earth and sods, except some small openings at the sides and top, and ignited at the bottom. After the pile is well ignited, the draft is checked so that the process proceeds at a slow rate. By this means the juices of the wood and the other volatilizable constituents are driven off as smoke and vapor, leaving the fixed carbon behind in the form of a light, porous mass, perfectly preserving the form and texture of the wood from which it was made.

Charcoal is also manufactured as a byproduct in the production of acetic acid. By the destructive distillation of wood in closed iron retorts there are produced acetic acid, methyl alcohol, creosote, tar, and other volatile substances which pass over and condense, leaving a solid residue of charcoal in the retort.

Charcoal burns readily with little flame and without smoke or soot, giving a strong and even heat, and is an excellent fuel for many purposes. It requires but little attention, and its combustion is readily controlled. Care should be taken in using this fuel in closed apartments, since if the supply of air should become insufficient there is danger of the formation of the poisonous carbon monoxide in dangerous quantities.

Coal.—Coal, as is well known, is of vegetable origin, consisting of the carbonized tissues of plants which, becoming buried beneath layers of earth and water, have gradually parted with much of their volatile constituents, leaving the solid carbon behind in the form of a dense, black mass, and mixed with a greater or less quantity of earthy impurities. Coal differs from charcoal in composition in that it contains much of the original hydrogen and other volatile constituents of the wood from which it was formed, while in the charcoal these have been more or less completely driven off by the heat employed in the process of manufacture.

Varieties of Coal.—For the purposes of the arts coals are divided into many varieties and sub-varieties, but for the purposes of the pharmacist it is sufficient to distinguish only two classes, the Soft or Bituminous and the Hard or Anthracite Coals. The soft or bituminous coals cleave readily into cubical or prismatic blocks, burn with a bright flame and produce much smoke and soot. They contain much volatile and tarry matters and are good steam producers.

Anthracite coals are much harder, break with a glassy, irregular fracture, have a shining surface and a somewhat metallic luster. They contain more solid carbon than the bituminous coals, burn with a bluish flame, and produce little smoke or soot. They are difficult to kindle as compared with the bituminous coals, and yield an intense heat.

The average composition of bituminous and anthracite coals is exhibited in the following table:

	Ash.	Fixed Carbon.	Volatile Carbon.
Anthracite,	4 to 16 p. c.	77 to 91 p. c.	2 to 7.5 p. c.
Bituminous,	1.5 to 5.5 p. c.	57 to 66 p. c.	25 to 32 p. c.

Coals are valued commercially according to their steam producing powers, and this is measured by the quantity of water which each pound of coal will vaporize as steam. Under the most perfect conditions a good grade of steam coal should evaporate fifteen times its own weight of water. Practically, however, the loss from imperfect combustion and in other ways so reduces the amount that the actual results rarely exceed two-thirds of the theoretical.

Coke.—Coke bears the same relation to coal that charcoal does to wood, and is manufactured by essentially the same process. By an incomplete combustion conducted in circular, brick-lined chambers, called coke ovens, and so arranged that the supply of air can be reduced at will, or entirely excluded, the more volatile portions are driven off, leaving the solid fixed carbon and mineral matters behind as coke.

The coals best adapted to the manufacture of coke are the bituminous varieties known as "caking coals" from their tendency to fuse and run together when heated. The escaping gases expand the fused mass, which thus acquires its porous or vesicular structure.

Coke is also obtained as a byproduct in the manufacture of illuminating gas, by heating coal to a high temperature in closed retorts. The volatilizable constituents are driven over and collected and purified, leaving a residue of coke behind. In addition to the gaseous substances other products are coal tar, carbonic acid, benzol, anilin, etc., some of them very valuable.

Coke and charcoal making are both processes of destructive distillation, except that when the solid products are the ones desired, the volatile ones are commonly permitted to run to waste. When the processes are conducted in closed retorts with provisions for collecting the volatile constituents, then the solid residues are the byproducts.

Coke burns like charcoal with a bluish flame, does not deposit soot, yields an intense heat, and is a valuable fuel for many pharmaceutical purposes.

LIQUID FUELS.

The principal liquid fuels are the petroleum products, the fixed animal and vegetable oils, and wood and grain alcohols.

The Petroleum Fuels.—In many parts of the earth's crust, chiefly in rocks of the Devonian and Carboniferous series, are found large quantities of liquid hydrocarbons known as petroleum, rock oil, etc. The crude hydrocarbons are mixtures of numerous compounds, and range from thin, light colored, to heavy, dark-brown or black, liquids, with disagreeable odors. The several constituents have different specific gravities and boiling points, and are separated from each other by fractional distillation. The more volatile portions which distill at the lower temperatures constitute the liquids known as gasoline, benzine, petroleum ether, naphtha, burning fluid, etc. The portions which pass over next, after purification, constitute the well known illuminant known as carbon oil or kerosene. From the portions which have still higher boiling points and from the heavy residues left in the retorts are manufactured the heavy lubricating oils, the official petrolatums, paraffin wax, etc.

Both gasoline and kerosene are valuable fuels when gas is not available. The greatest drawback to their use is the necessity of using specially constructed apparatus for their combustion when they are to be used for heating purposes. Burners for gasoline are usually so constructed that the liquid is vaporized by passing through a portion of the burner which is kept hot by the flame before coming to the point where combustion takes place. The vaporized fluid issues through a fine jet and crosses an open air space before coming to the part of the burner where it is burnt, by which means it supplies itself with the oxygen necessary to smokeless combustion. To begin vaporization the burner is first heated by burning a small portion of the liquid which is allowed to run into a small cup underneath. A properly constructed burner will yield a very hot, smokeless flame, which for many purposes is almost equal to gas.

The gasoline is usually contained in a reservoir elevated above the burner, with which it communicates by means of a pipe. In some kinds of stoves the liquid is contained in a receptacle which forms a stand for the burner, the gasoline being forced to the burner by means of a foot bellows or rubber compression bulb. (Fig. 23.)

Owing to the volatility of the liquid it readily forms a vapor which disseminates itself through the air, forming a dangerously explosive mixture, which ignites upon the slightest contact with a spark or a flame. The reservoir should never be filled when the burner is lighted, nor in a room where there are open lights or fire. Nearly all the accidents which have occurred in the use of gasoline have happened through neglect of these precautions.

The chief objection to the use of gasoline burners as heat producers is the necessity of generating the gas at every operation, and the explosiveness of the material.

Kerosene or carbon oil is also used as a fuel, the chief limitation to its usefulness being the necessity of using a wick, since it is less volatile than gasoline and cannot be easily vaporized like the latter liquid. For this reason, though a less dangerous, it is also a less valuable fuel.

The burners of oil stoves are essentially large lamp-burners, using a broad, flat or circular hollow wick. Combustion is more or less imperfect, yielding a bright yellow flame which deposits an abundant coating of soot upon every article with which it comes in contact. On this account it is necessary to place the article to be heated at a considerable distance from the flame, thereby causing a considerable waste of heat.

For some purposes oil stoves afford a convenient and easily regulated source of heat. (Fig. 24.)

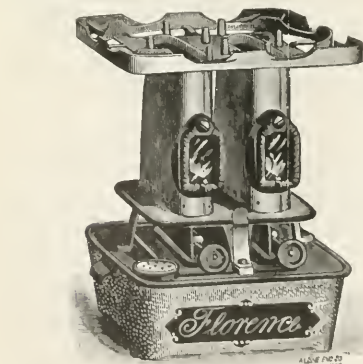


Fig. 24.—Petroleum Lamp Stove.

The Fixed Animal and Vegetable Oils.—Formerly certain of the fixed animal and vegetable oils, as Lard and Sperm Oil, etc., were frequently made use of as a source of heat in small operations, but have been almost entirely displaced by the cheaper and better petroleum products, and

so do not deserve the student's attention in this connection.

ALCOHOLS.

The two alcohols which are available as fuels are Ethyl, or Grain, alcohol, the common alcohol of the shops, obtained by the distillation of fermented grain, and Methyl, or Wood, alcohol, obtained as a byproduct in the destructive distillation of wood. Both burn with a nearly colorless flame and yield an intense heat. The calorific power of grain alcohol is greater than that of wood alcohol, though not sufficient to make up for the difference in price, which is more than double, owing to the United States Government tax.

Alcohol Lamp, S. W. H. Wick.—The commonest form of alcohol lamp is that of a small bottle-like vessel of glass, supplied with a brass tube in the neck to serve as a holder for the circular cotton wick. (Fig. 25.)



Fig. 25.—Alcohol Lamps.

The lamps are also generally provided with a glass cover or cap for the burner to prevent evaporation of the alcohol when the lamp is not in use. A cheap form of alcohol lamp may be improvised by fitting a cork to an empty morphine bottle, and passing a glass tube through the cork to serve as a wick holder. Another form is of the pattern known as the pocket stove, consisting of a bed of asbestos fibres covered with wire gauze. The asbestos being saturated with alcohol serves both as reservoir and wick. The advantage claimed for this form is that the alcohol cannot be spilled by upsetting, or while in transportation.

Alcohol Lamps Without Wicks.—Another form of alcohol lamp intended to be used for high temperatures, where gas is not available, is the Alcohol Blast Lamp, made to operate without the use of a wick. The flame of a small portion of the alcohol is made to heat the reservoir containing the remainder, thereby vaporizing it, as in the gasoline lamps, and the escaping vapor being ignited, burns with a very hot, smokeless flame. The vapor issues from the jet with considerable force, so that the lamp may serve in place of a blast lamp to a limited extent. These lamps are useful for the melting of glass tubes where a moderately high temperature is required for a short time.

The chief objection to the use of alcohol as a fuel is its cost, but where gas cannot be obtained it is the best that can be used for small operations, as in heating test tubes, crucibles, etc.

GASEOUS FUELS.

There are three varieties of gas which may be used for fuel: Natural Gas, Coal Gas, and Water, or Fuel, Gas.

Natural gas is a mixture of gaseous hydrocarbons existing naturally in the earth, and issuing from wells drilled to the porous strata which serve as reservoirs. Such wells are usually found in regions which produce petroleum also, and the gases are in fact to be regarded as lighter members of the petroleum series.

Artificial or coal gas is gas produced artificially by the destructive distillation of coal in closed retorts, whereby its volatile constituents are vaporized and distilled over. Certain of the products, as ammonia and sulfur compounds, which would be injurious to the gas as an illuminant, are removed as far as possible by the use of suitable absorbing agents, the value of the gas depending very largely upon the thoroughness with which these incombustible and disagreeable constituents have been removed.

When burned without prior admixture of air, artificial and natural gas yield a bright yellow luminous flame, suitable for illumination, but depositing a layer of soot upon any object which is held in contact with it. For heating purposes it is necessary to use a specially constructed burner by means of which the gas is caused to be mixed with a sufficient supply of air before reaching the point where it is to be burned.

Water or fuel gas is manufactured by passing superheated steam over red hot coke, whereby the steam is

decomposed into its elements, the oxygen uniting with the carbon of the coke to form carbon monoxid, CO, and passing over mixed with hydrogen. The reaction which occurs in the manufacture may be represented by the following equation:



Water gas burns with a hot, colorless flame, and yields an intense heat.

When it is used for illuminating purposes its percentage of carbon must be increased by mixture with hydrocarbons, obtained by distillation of coal, to give it flame greater luminosity.

The chief limitation to the use of water gas is the fact that it is manufactured in only a few sections of the country.

Stoves and Burners for Burning Gas.—In gas burners and stoves intended for heating purposes, the parts are so arranged that the gas is mixed with an abundant supply of air before it issues from the burner. The flame has thus within it a sufficient supply of oxygen to combine with all of the combustible elements present as fast as they are heated to the point of ignition. Such burners give flames which are colorless or nearly so, are intensely hot, and do not deposit soot upon the objects with which they come in contact. The simplest burner of this description is the well known Bunsen Burner (Fig. 26), which consists of a

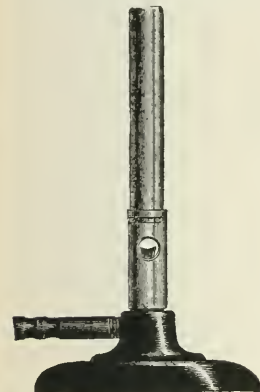


Fig. 26.—Bunsen Burner.

cylinder 10 to 15 centimeters high, and having at the bottom a small jet through which the gas enters. At a point level with the jet the cylinder is pierced at opposite sides with holes through which the inrush of gas through

the central orifice draws an abundant supply of air, which is thoroughly mixed with the gas by the time it has reached the top, where combustion is to take place. The inflow of air is controlled by a movable collar, which may be rotated so as to vary the size of the holes through which it enters. The burner is usually attached to a heavy base to insure its being held upright, and is connected with the gas supply by a length of rubber tubing, which permits its being moved about and placed in different positions.



Fig. 27.—Gas Stove.

Bunsen burner, whereby the gas is mixed with air before combustion.

One very useful form for the dispensing counter is the Fletcher pattern for the instantaneous heating of water, consisting of a coiled iron tube, over which a large gas flame is caused to play. (Fig. 28). The water enters at the bottom of the coil, and by the time it has reached the top, where it is to be drawn off, is heated to the boiling point. By this means the dispenser can always command a supply of hot water at a moment's notice, without the necessity of keeping it constantly on the fire.

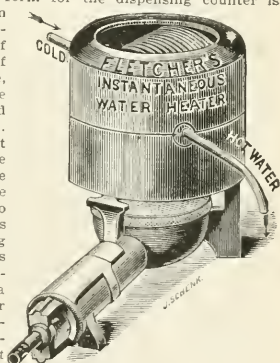


Fig. 28.—Instantaneous Water Heater.

COMMON-SENSE VIEWS ON SECURING THE PATRONAGE AND SUPPORT OF PHYSICIANS.*

BY CHARLES G. KLINE.

The only way possible to secure and retain the physician's support is to be a pharmacist in every sense of the word, and then to treat the physician in a common-sense sort of way. We will never secure it by keeping up "a howl" about the doctors dispensing. We must recognize the fact once and for all time that they have a legal right to dispense all of the medicine they want to in their own practice. They will always dispense more or less as long as they live, the quantity depending very greatly on how we treat them.

We have no legal or moral right to prescribe unless we happen to have a medical diploma, and in that case the other physicians would very likely want to patronize a druggist who is not an M. D. No sensible physician objects to our giving relief doses for headache or colic, if we have sense and knowledge enough to give the proper thing; what they have a right to object to is our attempting to treat the causes.

We should do everything possible to encourage their writing prescriptions. We should show them that we have the stock of drugs and chemicals necessary, and that we always fill their prescriptions just as they want them filled. Grant them the freedom of the store. Let them come behind the prescription case and in the laboratory if they are so inclined; occasionally invite them to if they are diffident or have a feeling of delicacy about it. Let them see us filling their prescrip-

tions or manufacturing our tinctures, elixirs, etc. It won't shake their confidence in us if we are what we claim to be; but instead it will be an object lesson that they will remember when handing a patient a prescription and hearing the oft-repeated query, "Where shall I take it?"

If a prescription for elixir bromide potassium (Jones) is received, it doesn't do anybody any good to fly off at a tangent, say mean things about the doctor to his patient, and so on! Consider that Jones sent a high-priced gentleman probably five hundred miles to see the doctor, especially to tell him about the preparation and to leave a good-sized sample with him. We have lived within two blocks of his office for years and never have been there except to ask his permission to substitute in a prescription just received.

Is it any wonder that he specified Jones? He did not know we could make a preparation certainly equal.

Go over the National Formulary with them, and if they express a desire to try something that you don't keep made up, make up a generous sample for them. Call their attention to any of the N. F. preparations whenever the opportunity presents itself.

Keep posted on the new remedies and preparations, and have literature on them at hand in case the physicians want to know about them. Let them get in the habit of thinking us interested in progress, and cognizant of the new discoveries and the like. They will then grow to depend on us more as aids. Don't hesitate to stock a small quantity of some new remedy that the doctors are using, and let them know it. If they want a preparation of any sort not in stock, get it.

Supply them with the medicine they dispense at a close margin. Better sell at cost than to let the supply

*Bulletin of Pharmacy.

houses furnish them. Protect the doctor from his patients, who very often have a habit of passing his prescriptions around among their friends. Our duty is very plain in the matter. Druggists, too, are often consulted about different physicians or by people who think of making a change, but in such cases we must observe a position of strict neutrality, unless it is an occasion where the services of a specialist are needed.

I know that there are some who, having read this far, will be thinking that the physician owes something to the druggist. I think so, too, but it is not my business to say how the doctor ought to treat the druggist. I am only telling one side of the story, and I think if we live up to our opportunities we will gain fair treatment a good deal quicker than by yelling "dispensing doctor" every time we have a spell of the blues and think the drug business has gone to the devil.

We have no business to cut on the price of standard preparations and then try to make up the loss by overcharging on prescriptions. It is the duty of the physician to see that his patient is not paying more than a reasonable price, and an honest doctor is willing the druggist should be paid for his skill as well as his drugs.

Let us work harder to be better pharmacists, more worthy of our calling. It will be better for us, for the doctor and for the public.

I have said nothing about the patent medicine part of our business. If there is a demand created for them, so long as we do not believe they are actually harmful we seem to be the natural distributing agents; but I can't see how a self-respecting druggist can push and recommend patents simply to make a sale. If he does he is guilty of counter-prescribing.

Let us swear off "kicking" about everything and try to do something for ourselves—what that something is depends on each one for himself. Above all let us have an epidemic of common sense that will number all the druggists in the land among its victims.

MAKING EMULSIONS.

M. C. Metzger (Proceedings Ill. Pharm. Asso.), reports that an emulsion as good as the best may be made in a very few minutes by following these instructions: Take one-half as much water as you have oil and acacia—no matter how much oil and acacia are employed. Thus, put the acacia, say one ounce, in a mortar, put three ounces oil in a graduate and two ounces water in another graduate (half as much water as oil and acacia). Now take the graduate with oil in one hand and the graduate with water in the other hand, pour the oil and water on the powdered acacia at the same time (not separately), stir thoroughly a few minutes, then add the balance of the water and the syrup, or whatever it may require, to complete the emulsion. Here are some formulas in detail:

Emulsion Castor Oil.

Castor oil.....	5 ounces
Powdered acacia.....	2 ounces
Syrup vanilla.....	3 ounces
Water enough to make.....	16 ounces

Put the powdered acacia (2 ozs.), in a mortar; put the castor oil (5 ozs.), in a graduate and $3\frac{1}{2}$ ounces of water in another graduate; pour the castor oil and water on the acacia, mix thoroughly, then add the remainder of the water and syrup and strain.

Emulsion Turpentine.

Oil turpentine.....	$\frac{1}{2}$ ounce
Powdered acacia.....	2 drams
Cinnamon water enough to make.....	4 ounces

Place the powdered acacia (2 drs.), in a mortar; put the oil of turpentine ($\frac{1}{2}$ oz.), in a graduate and 3 drams of water in another graduate; pour the oil and water on the powdered acacia, rub thoroughly, add the remainder of the water and strain.

Emulsion Cod Liver Oil.

Cod liver oil.....	8 ounces
Syrup tolu.....	2 ounces
Powdered acacia.....	2 ounces
Water enough to make.....	16 ounces

Flavor to suit.

Place the powdered acacia in a mortar; take the cod liver oil in one graduate and 5 ounces of water in another graduate; pour the oil and water on the powdered acacia, mix thoroughly, add the remainder of the water and syrup, flavor and strain.

(Special Correspondence.)

PHARMACY IN AUSTRALASIA.

Sydney, N. S. W., April 4, 1898.

PINK PILLS WIN.

Mr. Justice Williams delivered the judgment of the Victorian Full Court in the case of Shillinglaw vs. Tafts on Wednesday, March 9.

The following is the full text as read by his Honor:

"One Tafts was informed against for selling a poison, to wit, an admixture of arsenic called Pink Pills, contrary to the provisions of the Poisons Act, 1890. The admixture of arsenic, though small, was sufficient to bring the case within the Act, unless defendant could bring himself within the protection of section 14, which, amongst other exceptions, excepts patent or proprietary medicines. The bench dismissed the complaint, and it was not contended that their conclusion on the evidence that Pink Pills were a proprietary medicine was erroneous; but an order to review was obtained, on the ground that, assuming the pills to be a proprietary medicine, the proviso at the end of section 14, requiring entry in a book and labeling as poison, applied to proprietary medicines, and that as there had been no such entry or labeling, the decision was wrong. A decision of this Court, *Shillinglaw vs. Roberts*, 17, Vic. Law Report, p. 359, was referred to, which assumes that the concluding proviso of section 14 applies to all the antecedent exceptions in the section, though the point argued was not as to whether the proviso applied, but as to whether there had been a sufficient compliance with the proviso with regard to entry in a book. Having regard to this decision, the judge before whom the order to review came in the first instance, referred it to the Full Court. We have had to consider a point which was not argued in the case referred to, and was not necessarily involved in the decision, as in that case the defendant relied upon the protection afforded to sales by wholesale dealers, to which the concluding proviso of section 14 indisputably refers.

"Section 14 enacts that the Act shall not extend to the sale of any poison made up as a medicine, nor to the sale of patent or proprietary medicines, nor to the sale of medicines dispensed by veterinary surgeons, nor to the sale of fly poisons or packets of poisonous mixtures for the destruction of vermin when duly marked as such.

"Then follow the words: 'Nor shall it extend to any sales by wholesale dealers in the ordinary course of wholesale dealing if an order in writing, signed by the purchaser, shall be given for the supply of the same. Provided that all such sales shall be entered in a book, and that the bottle or other vessel, wrapper or cover, box or case immediately containing the poison be labeled as required by this Act.

"The question is, do the words 'all such sales' cover every sale before referred to, or only the last named sales by wholesale dealers? The frame of the section is opposed to the view that the proviso attaches to each exception. The exception of wholesale dealers is introduced by new words of exclusion, 'nor shall it extend to any sales,' etc. The word 'sales' is used for the first time, and the proviso relates to all such 'sales,' not to every such 'sale,' as before mentioned.

"But there are much stronger reasons for considering that the proviso was only intended to apply to sales by wholesale dealers, when we see that the proviso requires that the bottle or other vessel, etc., immediately containing the poison shall be labeled as required by this Act. What this Act requires as to labeling is to be found in section 7, which applies to all persons selling poison, either by wholesale or retail, and uses the same language as the proviso as to bottle, vessel, wrapper, cover, box or case, and requires that it shall bear the word 'Poison' printed conspicuously, together with the name of the article, and the name and address of the seller thereof. It could not be intended that a medicine made up from a physician's prescription should be labeled 'Poison,' or that the name of the article, if name could be given to it, should be written upon it. The proviso seems merely to have the effect of saying that the exception of sales by wholesale dealers from the general provisions of the Act, shall not exempt them from the obligation of labeling contained in section 7. We decide that the obligations

of the concluding proviso of section 14 do not attach to the sale of patent or proprietary medicine. The order to review will therefore be discharged, with costs."

Fatal Misadventure by a Chemist.

An extraordinary and tragic misadventure occurred at Melbourne on the 6th of March, resulting in the death of Dr. S. I. Williams, a well-known medical man, and the poisoning of one of his patients, a Mrs. Henry Turner. Dr. Williams, who appears to have been in the habit of personally using hypodermic injections of cocaine or morphia, apparently found it advisable to administer the same to the patient referred to, who had had several operations performed on her, and at times suffered very acute pain. Preparatory to visiting his patient on the evening referred to, Dr. Williams called at the pharmacy of James Christopher, where he was attended to by Mr. Christopher, Jr., a duly qualified chemist. From a statement subsequently made by Mr. Christopher, Jr., it appears that Dr. Williams asked to be supplied with a certain quantity of cocaine, and also with a solution of sulphate of morphia, which, as was thought at the time, was given him with the label "Sulphate of Morphia" attached. Shortly afterwards Mr. Christopher, Sr., entering the shop, observed a bottle of sulphate of atropia on the counter, and his inquiries in reference to it elicited the fact that a terrible mistake had been made in supplying Dr. Williams with the sulphate of atropia instead of sulphate of morphia. Highly alarmed, Mr. Christopher lost no time in transmitting a telephone message to Dr. E. H. Williams, brother of the deceased, but, as was subsequently found, too late to prevent Dr. S. I. Williams from using the drug himself and administering it to his patient. It appears that after leaving the house of the latter, Mrs. Williams, who was driving with her husband, found him in a state of collapse, and immediately took him to Dr. Beckett's surgery, where the nature of the mischance was discovered and remedies applied. Dr. Williams was subsequently removed to his own house, but never regained consciousness, and died on the following day. The inquest was held on the 9th, when the principal evidence was that of Dr. John Brett, of Collins street, who testified that he had, in the presence of Drs. T. G. Beckett, E. J. Bird, F. H. Cole and E. H. Williams, made a post-mortem examination of the deceased. Over the extensor or external surfaces of both forearms were the remains of needle punctures, there being scarcely a pin-point of skin which had not been punctured by the needle. Numerous, though less so than on the forearm, punctures were found scattered over the anterior surface of both thighs and legs. These punctures were of various dates, some old, leaving well marked, bluish-white scars. Two on the left forearm seemed to be quite recent, the superficial skin being raised, and apparently contained some fluid scum. This portion had been excised and placed in a bottle for forwarding to the Government analyst. In reply to the Coroner, Dr. Brett stated that all the post-mortem appearances were consistent with the theory of death by poisoning by some alkaloid. The chemist, who pleaded mistake, was committed for trial on a charge of manslaughter.

Intercolonial Reciprocity.

The most important recent utterance is that in the annual report of the Victorian Pharmaceutical Council. It shows that Victoria still hopes to see reciprocity with New South Wales within a twelvemonth, and that some at least on the Victorian side are prepared to reconsider, and perhaps to waive, the objections which upset the so-called "treaty." No doubt there will be sentimental grievances and objections at first, but these must pass away with the lapse of time. This intimation is being noted by boards in the other colonies, who felt disposed to allow the question to rest. The "treaty" was sprung upon them as a surprise, and none of the smaller colonies would feel that their interests would be served by an arrangement between Victoria and New South Wales, in which they had no say. As regards the desire of New South Wales to refuse to recognize the registration in any colony of men holding only British certificates, there are two things to be considered. First of all, the very distinct and emphatic reply of the British Society to the letter sent in the name of various colonies from Victoria leaves little hope for success in

the policy of compulsion. Secondly, there is the important question whether it is within the power of a Pharmacy Board to discriminate in this way. The reopening of the reciprocity question means that the whole position of things as regards the English diploma will have to be considered.

Atmospheric Gas.

The Sydney sensation of February and March was the bursting of the "atmospheric gas" bubble. A company was formed for the manufacture of gas by a new process, which was going to startle the world and revolutionize all existing modes of lighting business and dwelling houses. Its chief recommendation was to be its cheapness, it being computed that the net cost would not amount to more than 3d. per 1,000 feet. The bait took; shares sold quickly and were resold at high premiums. The bubble burst when it got noised abroad that the alleged patentees-cum-promoters had disappeared with a sum of money variously estimated at between £3,000 and £15,000. The necessary ingredients for the gas were alleged to be commercial ether, citronella oil and a certain percentage of water, but it now transpires that the alleged inventors, when making their experiments to satisfy the directors and the public, had a happy little device rigged up in an adjoining office for communicating a much more reliable light-giving agency, in the form of gasoline, to the machine which was declared to work such wonders. Singularly enough, Mr. R. T. Bellemey, president of the Pharmacy Board, was asked by several intending speculators, prior to the formation of the syndicate and company, to inspect the apparatus and give his opinion. He did so. The man in charge declined at that stage to state what chemicals were utilized in the process, on the ground that the patent had not been granted—and never has been, by the way. The gas was duly turned on, and Mr. Bellemey's trained senses immediately detected the smell of oil of citronella, which he promptly told his friends was simply used to disguise the smell of natural gas, permeated with faint odors of benzoline, or very fine kerosene. Mr. Bellemey's presence subsequently received striking indorsement, and his friends have to thank him for warning them off a poor speculation. The alleged promoters, Lee and Elliott, were arrested in 'Frisco on the arrival of the 'Frisco-Sydney mail, but were released on account of there being no power of extradition involved in the case.

The N. S. W. M. P. S. Diploma.

Ever since the new prints of the New South Wales Pharmaceutical Society's diploma were struck off, some six years ago, dissatisfaction has been expressed with them by the members of the Council. A change has often been suggested, but not until the present has the proposed alteration taken definite shape. With the new condition of things, the society being registered a limited company, the opportunity presented itself of having a new design, and this was agreed upon at the month's meeting of the council. It was the general opinion that colors should be abandoned, and something in black and white, like the diploma of the Pharmaceutical Society of Great Britain, adopted. This was finally agreed upon, and the president and the secretary were instructed to secure an appropriate design. Many faults have been found with the diploma, which has been in use for the past six years. The design is singularly weak, and the drawing equally defective, while the coloring gives it the appearance of a cheaply got up picture. The Australian coat-of-arms is incorrect, inasmuch as and instead of being its support, both emu and kangaroo appear to be preparing for a bound away from the shield. The sage of the East, with the old emblem of pharmacy, snake entwined about a wand, is not so bad, but the figure representing Australia is a sad reflection upon her symmetrical sex. No lady likes big feet, but the young woman typified in this diploma exhibits a foot of extraordinary length and unshapeliness. No one ever looks at the diploma without commenting on its phenomenal length, and its pronounced lobe on the beautiful feet of Australian damsels. The new diploma is being got ready for issue.

A Chewing Gum Action.

The action commenced early in March by the American Chemical Company against the firm of "M. A. J. Rob-

ertson," of Melbourne, claiming £600 damages and asking for an injunction to restrain the defendants from selling chewing gum in boxes or tins resembling those used by the plaintiff company, was settled at the end of the month. By consent a perpetual injunction was granted. The defendant is also to pay £20 damages and £27 10s. costs.

Are a Pharmacist's Communications Privileged?

This question was raised in the Melbourne Divorce Court the other day. Mr. Siegfried Pincus, pharmacist, was subpoenaed to give evidence in a cross suit for a divorce. Before giving his evidence, he appealed to the judge to say that the physician's message to the pharmacist conveyed in the prescription was a privileged communication, and need not be disclosed in the law courts. After consulting the Evidence Act and a few words from counsel, Mr. Justice Holroyd declared that the privilege which had been accorded in some cases to the communications of a patient to a physician seemed never to have been extended to a chemist. So, when questions are to be asked in law courts, in civil cases as in criminal, as to prescriptions dispensed, they must be answered. But the pharmacist, especially if he desires to say as little as he may, would be clearly within his rights in refusing to give evidence concerning the physician's intention in the prescription, the disease for which it is prescribed, or the therapeutic effects of the ingredients. The pharmacist is an expert in pharmacy, not in therapeutics, and he may reasonably refuse to give expert evidence on the latter subject. He cannot know the physician's mind; and it is at least possible that remedies in any prescription under review may have been prescribed experimentally to confirm or refute a doubtful diagnosis. In the case under notice, the pharmacist had no prescriptions in his book under the required name. Some prescriptions were produced, and he was asked insinuatingly to say what they were for. But counsel made bad shots; his questions missed all incriminating points. Two of the prescriptions contained hydrargyrum and potassium iodide. Counsel fixed his attention on the latter, and wanted to know many things about it. But the other ingredient passed without notice. In all such circumstances pharmacists would be wise to disclaim authoritative knowledge of the intention of the prescriber, and the possible therapeutic effects of a prescription or its ingredients.

The gold medalist of the Victorian Pharmaceutical Colleges for 1897 is Miss Jane B. Wollen. This is the first time a lady student has received this award.

DISTILLED WATER: ITS PREPARATION BY A SIMPLE AUTOMATIC AND INEXPENSIVE APPARATUS; AND ITS PRESERVATION.*

H. T. CUMMINGS, M. D., Tacoma, Wash.

In view of the fact that distilled water is an absolute necessity for many pharmaceutical purposes, the writer desires to describe an easily worked, inexpensive and automatic apparatus for producing the substance, and also to consider means for its proper preservation. But first he would consider chemical methods for purifying unsuitable waters and rendering them fit for ordinary purposes when the excessive refinement of distilled water is not necessary.

NATURAL WATERS.

The present edition of the Pharmacopœia defines "Aqua" as "Natural water in its purest attainable state;" but it goes on to prescribe definite properties which it shall have. It must be a "colorless, limpid liquid, without odor or taste at ordinary temperatures, and remaining odorless while being heated to boiling." And it must be free from metallic impurities, and not possess more than the "limit" of ammonia, soluble salts, sulphates, chlorides, nitrates and organic or other oxidizable matters; which limits are determined by chemical tests described. If the apothecaries of Maine could turn the Poland or the New Gloucester Shaker Springs into the back room of their shops, the pharmacopœial demand would be easily complied with, as these are the sources

of the purest water known in Maine, the amount held by them in solution, including organic matter, being somewhat less than four grains to the gallon.

But as springs, wells, rivers and lakes are generally loaded with substances dissolved or suspended therein, it becomes a problem of no little importance how to purify water taken from these sources with the least trouble and the greatest expedition. "No water in nature is perfectly pure; rain and snow water caught even in perfectly clean vessels contain, especially at the beginning of rain, foreign substances which are present in the atmosphere as dust or vapor. Ammonia, nitrous and nitric acids, chlorine, sulphuric acid, lime, soda, potash, magnesia and organic matters have been found therein by many observers." And in addition to all this, the natural waters, in percolating through the soil, take up whatever is soluble; besides, where they are exposed to the direct rays of the sun, they develop coniferæ, as well as more distinctly phanerogamous species of plants. In cisterns where rain water is collected and stored, remarkable growths of coniferæ and other microscopic plants are produced, which do not improve the taste or the odor of the water. The purification of such waters often becomes a serious question, even if it is not desired to obtain them chemically pure.

PURIFICATION BY CHEMICAL MEANS.

The purification of foul waters for pharmaceutical or domestic use, or to render them drinkable, is accomplished in various ways. Sometimes simple filtration, through powdered silica, sand, charcoal, paper, or other media is sufficient. Water may be perfectly clean and devoid of foreign taste, but yet prove deleterious, or even heget fatal diseases, carrying into the human system the germs of typhoid, cholera, diphtheria, or tuberculosis. In such cases neither filtration nor chemical agents seem to have much power for good. The application of a boiling heat alone proves a protection against infection; and this action is earnestly advised where there is the slightest chance of danger. It had best be done, too, immediately upon drawing the water, for it has been found that bacteria increase remarkably in numbers within a few hours. Miguel found, for instance, that certain water at 60 degrees F. contained in a cubic centimeter forty-eight bacteria; while three hours later, at 69 degrees F., it contained 125; twenty-four hours later, at 70 degrees F., 38,000, and after seventy-two hours, 590,000, notwithstanding which the water was perfectly clear and appeared as good as the purest potable water.

While there is no reason to fear infection, chemicals may be employed with good effect to fix some volatile bodies, and to throw down others, and thus withdraw them from solution. One formula which is reasonably effective for this purpose is that of Kletzinski, published in the twenty-third volume of the Proceedings of the American Pharmaceutical Association. It is as follows:

Phosphate of aluminum.....	1 part
Phosphate of oxide of iron.....	2 parts
Phosphate of magnesium.....	2 parts

dissolved in a sufficient quantity of the phosphoric acid of the Austrian Pharmacopœia (16 per cent. strength). The phosphates must be freshly prepared and the solution filtered. When required as a purifying agent, the solution, which will keep any length of time, is added to the water in small quantities, as long as cloudiness is produced; the water is then allowed to stand until the precipitate has subsided, and the clear water may then be used for drinking or other purposes. The action of the phosphatic liquor is explained thus: The lime salts usually contained in water will abstract the phosphoric acid that holds the phosphates of aluminum, iron and magnesium in solution, and these salts, being deprived of their solvent, will precipitate along with the phosphate of calcium (lime) formed, carrying with them, either mechanically or in chemical combination, such impurities as may exist in the water. The magnesium absorbs all the free ammonia, the iron combines with the sulphureted hydrogen and other gases of decomposition present, while the aluminum and phosphate of calcium will mechanically drag down suspended impurities. The addition of a slight excess of the precipitant is in no way objectionable.

For the removal of mud from water, there are two modes of operating. R. F. Fairthorne, of Philadelphia,

* Prize paper in the Bulletin of Pharmacy Contest.

has found that water can be clarified expeditiously and well by shaking one gallon with one ounce of phosphate of lime, allowing it to settle, and then after two or three days filtering it through absorbent cotton, pressed tightly into the throat of the funnel. The other method is as follows: Filtering paper is soaked in a mixture of forty-three parts of liquor ferri chloridi and fifty-seven parts of water, and then dried; a soda paper is made similarly with a saturated solution of sodium bicarbonate. The water is shaken first with a strip of the iron paper, and then with a strip of the soda paper. The carbonate of iron formed absorbs all impurities. The water is then strained through sponge or absorbent cotton.

F. B. Kilmer, of New Brunswick, N. J., has described a method of purifying water fully as simple as that of Fairthorne, mentioned above, and which in the hands of the present writer has proved very effective, namely, the solution of $1\frac{1}{2}$ ounces Troy of crystallized alum in 32 fluid ounces of water. This solution, used in the proportion of $\frac{3}{4}$ ounce to half a gallon of foul, ill-smelling and discolored water from the bottom of a cistern, will render it clear and bright, and fit for general use. If care is used not to employ an excess of the solution, the alum, as Mr. Kilmer says, combining with the organic and mineral impurities of the water, is carried down with them. The resulting water is next to distilled water for purity, and can be obtained in no other way so easily.

Mr. Labor, a pharmacist of Jaligny, has recorded that by collecting, melting and filtering pure snow he has obtained a supply of "distilled water" perfectly insensible to all the tests for impurity, such as nitrate of silver, perchloride of mercury, soluble salts of baryta, alkaline carbonates and oxalate of ammonia. Melted ice has repeatedly been recommended for the same purpose, but is looked upon with suspicion or disfavor by both medical men and chemists. It should be observed that pure snow can be obtained with certainty only at the closing portion of a storm, after a heavy fall of snow has swept the atmosphere clear of dust, spores, germs and animalculæ of whatever kind, especially in cities and other places of dense population.

DISTILLED WATER.

The methods detailed above will yield a "natural water" which is sufficiently safe and suitable for ordinary purposes, and which will correspond to the requirements of the Pharmacopœia. But for certain purposes, a water must be had which is absolutely free from all fixed or volatile foreign constituents. Such a water can only be obtained by distilling. Distilled water should be used in the preparation of eye waters and the like; and always, too, in making solutions of "corrosive sublimate, silver nitrate, lead acetate and subacetate, potassium permanganate, iron and zinc sulphates, quinine sulphate, cocaine hydrochlorate, morphine sulphate, hydrochlorate and acetate, and in general terms, all of the alkaloids and their salts." If a water be used for these purposes which is not entirely free from salts, new chemical compounds are formed, which means either discoloration, precipitation or undesirable change. For the same reasons, distilled water should be used in making medicated waters and diluted acids. It is explicitly demanded in seventy-nine formulas of the Pharmacopœia.

The absence of stills or retorts in the majority of ordinary pharmacies is a reason for the general ignoring of the requirements of the Pharmacopœia in this regard. Those who have attempted its preparation when they have had any distilling apparatus, have found the labor of attending to the condensation of the steam, the filling of the still, and the care of the furnace, varied, perhaps, by the necessity of attending to wordy customers, or compounding a complicated prescription, sufficient on one trial to discourage them from a repetition. Apothecaries have eyed these formulas with a sort of despair, and in a majority of cases have quietly obtained their distilled water (sic?) from the "moss-covered bucket that hung in the well," or from the pump, or from the faucet at the sink in their back room, while physicians have had to content themselves as best they could with supplies from the same sources, or to fall back on the aromatic waters.

AN INEXPENSIVE AND AUTOMATIC DISTILLING APPARATUS.

Now the writer desires to describe an inexpensive, effective and automatic distilling apparatus, which can be used with little or no trouble by any pharmacist. Procure a square copper boiler of say two or three gallons capacity. Have a half-inch pipe inserted in the median line two inches below the upper edge. This pipe should be three inches long, and bent downwards, even vertically. By a rubber tube join this pipe to the inner tube of a ten-inch Liebig condenser (costing 55 cents). With the other end of the inner tube of the condenser connect either a rubber tube or a crook-necked glass tube, which let protrude into a gallon bottle. Here, then, are still, condenser and receiver. Now through the jacket of the condenser water at ordinary temperature must be kept running in order to condense the steam which passes through the inner tube. For this purpose set at some height above the condenser a pail of ordinary tap water. With a rubber tube siphon this water to the lower end of the condenser, regulating the flow by a pinch-cock. To catch the water as it emerges from the upper end of the condenser place a pail beneath the outlet pipe. The condenser (supported by a clamp or otherwise), will have to be inclined at such an angle that the condensing water will run in at the lower end and out at the upper without any difficulty. The copper boiler (the still) may be placed on an ordinary stove, or better and more convenient, on the oil stove in the back room. This apparatus set up will work automatically, the only attention required being to refill the pail of condensing water, as, at rare intervals, it becomes emptied. Distilled water made so easily, so cheaply, and so effectively, the pharmacist has no excuse for not using it whenever necessary.

The receiver bottle should, of course, first be rendered as chemically clean as possible, and the tube which conducts the distilled water into it should be packed at the mouth of the bottle with absorbent cotton, closely enough to exclude floating dust, germs, etc., but not tight enough to create pressure. The first tenth of the distillate should be thrown away, as it contains carbonic acid, ammonia and other volatile impurities, and the last tenth of the water should not be distilled, lest it pass over with an empyreumatic taste.

If water be used which is not very desirable, it would be well to purify it by one of the methods outlined above, and by boiling it a few minutes, before subjecting it to distillation. In placing the water in the still previous to starting distillation, do not fill it more than two-thirds full, leaving room in plenty for the steam.

PRESERVATION OF DISTILLED WATER.

But once having distilled water, we must use means of preserving it from chemical accretions through dust, etc., and from bacterial contamination.

Upon the preservation of distilled water it will be sufficient to quote the remarks made by Dr. Edward R. Squibb in closing a discussion of the subject at one of the sessions of the American Pharmaceutical Association. Dr. Squibb said: "This is a broad subject, and it seems useful to mention a plan I have adopted lately, and have recommended once or twice to others as an excellent means of preserving distilled water. Let a bottle be made chemically clean, and be fitted with a good clean cork or rubber stopper. Pierce this stopper with two holes for glass tubing of good size. Let one piece of tubing pass through the stopper so as to reach the bottom of the bottle and project half an inch above the stopper, and tie this end over with a double fold of clean muslin. Let another piece of tubing be bent at a right angle, and having passed one end just through the stopper, tie the other end over with a double fold of clean muslin. Then fill the bottle entirely full of distilled water which may have had the least practicable air contact, and put the stopper as above described in place. When the water is needed from time to time it is poured out through the short bent tube, while the air which enters to replace it is filtered and passes in through the straight tube. In this way, if the water be free from the spores of *confervæ*, as it usually is when freshly distilled with care, it will remain free, since only strained air can get access to it. When the bottle is not in actual use, the neck and tubes are nicely protected from dust by means of an inverted beaker,

whose lip rests on the shoulder of the bottle. Distilled water carefully made and then kept in this way will be preserved for a considerable time. Since I adopted the plan I have had no trouble whatever from confervæ or from any other annoyances."

PHARMACY.

MERCURIAL OINTMENT.—A. Gawalowski (Ph. Post), recommends addition of a trace of ethyl nitrite, to hasten extinction of the mercury.

RENADEN.—This organo-therapeutic preparation has been examined clinically by Prof. Concetti, in Rome, who finds it a good remedy for acute and chronic nephritis, particularly in children. It is stated to be entirely harmless. (Ap. Ztg.).

OX GALL IN PILLS.—Dr. Pfaff (Monde Med.) recommends pills of ox gall for chronic constipation, which is due to weakened peristaltic action. To prevent absorption in the stomach, they are coated with salol. The dose is 1 to 2 gm. (15 to 30 grains) daily before meals. (Ap. Ztg.).

MERCURY PLASTER.—The following formula is given by Miehle (Ap. Ztg.): Concentrated mercurial ointment (75 p. c.) 267 parts, yellow wax 100 parts, lead plaster 623 parts, to make 100 parts. The wax and lead plaster are melted, and when partially cooled the mercurial ointment incorporated. The plaster contains 20 per cent. of ointment, has a gray color and adheres well.

CORONILLIN.—The glucoside of *Coronilla varia*, whose introduction as a substitute for digitalis has been repeatedly attempted within recent years, does not seem to be of sufficient value to gain the confidence of physicians, to judge from the latest clinical experiments. Its direct influence on the pulse is questionable; in many cases diarrhoea follows its use, and idiosyncrasies were frequently noticed. (Südd. Ap. Ztg.).

ALCARNOSE.—This albumin preparation has been examined by Hüller, who gives the following composition: Digested albumin 23.8 p. c., extract and salts of meat 2.3 p. c., digested carbohydrates (dextrin, maltose) 67.1 p. c., salts (including sodium chloride, alkali carbonates, phosphates, etc., and traces of iron) 6.8 p. c. Dr. Knauer reports very favorable results in the treatment of patients with weak digestion, who take this remedy easily and increase rapidly in weight. (Südd. Ap. Ztg.).

CALCIUM CARBIDE IN THERAPEUTICS.—Two French physicians, Guinand and Livet, applied calcium carbide to a purulent wound. Evolution of gas soon took place, and a characteristic odor became noticeable. At the same time the formation of pus ceased. The patient experienced at first a slight burning sensation, but this soon stopped, and in four to five days, the treatment being continued, the wound was greatly improved. (Südd. Ap. Ztg.).

TO REMOVE SPOTS FROM MARBLE.—Petroleum spots are removed by a mixture of 2 parts of soda, 1 part of finely powdered pumice stone and 1 part of finely powdered lime, which is made into a paste with water. This is rubbed on the spots, allowed to remain a few minutes and then washed off with soap and water. To clean marble that has become soiled by the dripping of stove pipes, etc., it is covered with a thick layer of powdered French chalk, previously well moistened with benzine. This is then covered over to prevent evaporation of the benzine. After five to six hours the chalk and benzine are removed and a fresh layer applied, and this is continued until the spots have disappeared. If the benzine is not successful, a little chloroform may be added, but no acid should be used, as it acts upon the marble. (Südd. Ap. Ztg.).

PREPARATION OF GRAPHITE.—Acetylene is heated under a pressure of about 5 atmospheres at 150° C. with

an aqueous solution of hydrogen dioxide. A reaction takes place, resulting in the formation of graphite and water. The graphite is separated by filtration. A carbide may be employed instead of acetylene. (Chem. Ztg.).

CONCENTRATED MERCURIAL OINTMENT, as prepared by F. Miehle (Ap. Ztg.), is composed of mercury 75 p. c., woolfat 18.75 p. c., and liquid paraffin 6.25 p. c. The mercury is extinguished with the woolfat alone, and is carried to a fineness of 2 to 4 micro-millimeters. Near the end of the operation the paraffin oil is gradually added. The property of woolfat to extinguish mercury in a very short time to a high degree of fineness, is probably due to its viscosity. The concentrated ointment is used for making plasters, pills, etc.

TABLOIDS ELAÏD.—In view of the conversion of ferrous carbonate into ferric hydrate on exposure to the air, which the addition of sugar cannot prevent entirely, Dr. Aufrecht recommends in Med. Wochschr. a new iron preparation in the form of tabloids. They consist of a mixture of dried ferrous sulphate and sodium carbonate, and are protected from the influence of the air by a coating of gelatin, chocolate, etc. Formation of ferrous carbonate takes place on solution in water. (Ph. Post.).

UNGUENTUM PLUMBI CARBOLISATUM is directed by F. Miehle (Ap. Ztg.) to be prepared as follows: Solution of subacetate of lead 10 parts, carbolic acid $\frac{1}{2}$ part, "unguentum durum" (solid paraffine 40 p. c., liquid paraffine 50 p. c., woolfat 10 p. c.) 89.5 parts. The carbolic acid is mixed with the vehicle and then the subacetate incorporated. The product is a white or yellowish-white, permanent ointment. From theoretical considerations this ointment might be called irrational, as carbolic acid is an irritant and subacetate of lead a sedative, and the effects might be expected to neutralize one another. Nevertheless it has been found of much value in treating all kinds of open wounds and abscesses. The case is similar to that of iodoform, which in itself has absolutely no antibacterial properties, but on contact with the living tissue becomes one of the best antiseptics.

REVISION OF THE ATOMIC WEIGHTS OF NICKEL AND COBALT.—Prof. Richards, of Harvard University, has for some time been at work on a revision of the atomic weights of nickel and cobalt. These weights form an apparent exception to Mendeleeff's law, as one would expect the atomic weight of nickel to be the greater instead of being the less, as it really is. It has been supposed that the discrepancy was due to impurities in the metals used by previous experimenters, and Prof. Kruss imagined that he had isolated a new metal—enionium; but its existence has never been confirmed. Prof. Richards has used great care in purifying his material, and has used in both cases a bromide of the metal for analysis. He finds the atomic weight of nickel to be 58.68, and that of cobalt 58.93, thus confirming previous observations as to the anomalous order of these elements in the periodic system. No explanation can yet be given. Prof. Richards is testing his results by the use of other compounds than the bromide. (Sci. Am.).

PREPARATION OF SUPPOSITORIES.—A. Bodenfeld (Ap. Ztg.) proposes the addition of a little anhydrous lanolin to the suppository mass, particularly when liquids are to be incorporated with the cacao butter. It is also very useful as an addition to masses that are apt to crumble; e. g., 50 per cent. iodoform bougies, in which case a further addition of powdered tragacanth is still better. Pouring the fused mass into molds is admissible only when there is no risk of the medicinal agent settling to the bottom. Tannin bougies: Melt 10 parts of gelatin and 15 parts of glycerin together on a waterbath, add the tannin, dissolved in 5 parts of glycerin, and continue heating until clear. Then pour out into warmed and greased molds or draw up into glass tubes by suction. Iodoform bougies: Mix 10 parts of gelatin with 10 parts of distilled water and 20 parts of glycerin and let them stand two hours to soften the gelatin. Then melt on a waterbath and add 20 parts of iodoform powder, pre-

viscously rubbed up with a little water. The product contains 33.1-3 per cent. of iodoform.

TO BRONZE COPPER SURFACES.—A French process consists in the application of ammonium sulphide and arsenious sulphide. The objects are covered with a dilute solution of yellow ammonium sulphide and dried at a low heat. After removing the separated sulphur by brushing, a dilute solution of arsenious sulphide in ammonium sulphide is applied. The golden color at first produced is charged to a fine bronze after repeated painting with the last mentioned solution. Instead of arsenious sulphide, a solution of antimonious sulphide in ammonia water or ammonium sulphide, may be used. In this case various shades of red are produced. (Drog. Ztg.).

PRESERVATION OF RUBBER GOODS.—In an article in *Gummi-Ztg.*, saturation with paraffin is recommended as a practical and effective means of preserving vulcanized rubber articles. The articles are immersed in a bath of paraffin heated to 100° C. and left in the bath one-half to three minutes, according to the size of the objects. After saturation they are either hung up or laid upon wire frames covered with bibulous paper, in a room kept at 100° C. This is for the purpose of removing the externally adhering excess of paraffin, which requires a few hours. The rubber absorbs 2 to 8 per cent. of the paraffin. Form, size and elasticity of the goods remain unchanged by this treatment. Sensibility to light and other external influences, hardening and breaking are much lessened. The power of resisting the action of chemicals is increased also. The breaking of rubber articles may be prevented by washing with dilute ammonia or weak alkali solution. Soaking in a bath of a ½ per cent. solution of creolin and rinsing off before using is also recommended to preserve the pliability. Boiling in a solution of soda soap, then rinsing in luke warm water and immersion in a bath of a solution of ammonium carbonate heated to 80 or 90° C is another method. Carbonic acid is evolved and polysulphides are formed with sulphur dissolved from the rubber. Too strong solutions must be avoided, as they would make the rubber hard on the surface and cause it to crack. The object of this process is the removal of sulphur, in order to soften the rubber and increase the keeping qualities. Rubber stoppers, tubes, etc., which are used in laboratories, may be kept in good condition by laying them in a 3 per cent. solution of carbolic acid. General rules in the care of rubber articles are avoidance of contact with fats, ethereal or fatty oils. Tubes should not be subjected to great variations in temperatures. Small cracks may be closed by softening the spot with a hot iron, after moistening the place with oil of turpentine. Garden hose should be well dried after using and hung up dry. (Drog. Ztg.).

OINTMENT OF YELLOW MERCURIC OXIDE.—According to Prof. Pagenstecher, the requirements for a useful ointment, that the oxide must be in a very finely divided condition, is hardly met by one pharmacist in ten. This is readily ascertained by examining a little of the ointment under a magnifying glass. Small lumps of oxide will nearly always be found. Such an ointment is liable to cause irritation and serious inflammatory disturbances in the corneal cavity. P. demands that a well prepared ointment should show under a microscope magnifying 350 to 400 diameters a uniform distribution of very small, amorphous particles. For this purpose the oxide made in factories or in accordance with the pharmacopœias is totally unfit, as it forms into small lumps and granules during the drying and on keeping, which can be reduced to the necessary degree of fineness only by trituration of several hours, which in practice is out of the question. O. Rothe proposes the following method, which is claimed to give an ointment meeting all requirements: Ten parts of mercuric chloride are dissolved in 1,000 parts of warm water, the solution filtered, and when cold poured in a thin stream into a mixture of 30 parts of soda solution and 300 parts of water, with constant stirring. The mixture is stirred occasionally during one hour, the precipitate then collected on a filter, washed with water and then with

absolute alcohol until all water is displaced. The filter with precipitate is spread out on several layers of bibulous paper placed on a sieve, so that evaporation may take place from the bottom as well, the precipitate protected from dust and light with a sheet of paper and left standing at room temperature for a few hours, when it will be dry and in form of an impalpable powder. It is mixed at once with nine times its weight of white vaseline, and kept in stock to be mixed on demand, with the ointment bases required by the physician. The influence of daylight is to be avoided during the whole procedure. If the presence of water is not objectionable, the precipitate may be incorporated with the vehicle at once after washing with water and draining. (Ap. Ztg.).

SOMETHING NEW REGARDING THE POTATO.—One would imagine that science could not furnish us with anything new in our daily foods, but it is a remarkable fact that our food potato has not been sufficiently examined from a scientific standpoint, while greater attention has been paid to the varieties of potatoes employed for industrial uses. (Staats Ztg., Sci. Amer.). The French chemist, Balland, has striven to fill this void in an essay presented to the Paris Academy of Sciences, divulging many interesting characteristics of the potato used for food. Aside from the skin, which only represents a small fraction of the total weight, the potato consists of three layers, well distinguishable with the naked eye if a thin slice is held against the light. Still more distinctly these three layers become visible if photographed with the Roentgen rays. The strata are of different thicknesses, which decrease toward the interior. The outermost layer contains comparatively the most starch, but less nitrogenous substances; with the innermost layer the proportion is just the reverse. The middle layer has a mean composition between the two others. The skin layer is the driest, while the inside marrow contains considerably more water. On an average, a potato contains three-quarters of its weight of water, two-tenths of starch and one-fiftieth of nitrogenous matters. Balland has discovered the important fact that the food value of the potato is so much greater the more nitrogenous substances it contains, and so much smaller the richer it is in starch. In the best table potatoes the proportion between nitrogenous matters and starch attains three times as high a value as with the food potatoes of the lowest quality. Hence the value of a potato can be ascertained by a chemical analysis; but it so happens that the food value of different varieties of potatoes can be judged according to their behavior when boiled. We all know that some potatoes swell up in hot water, cracking in certain places, and even breaking apart, while others retain their original shape, even when well done. It was supposed, formerly, that the cracking or breaking apart of potatoes was indicative of an especially large percentage of starch, the starch swelling up and breaking the skin. According to the latest investigations, this is erroneous, the percentage of albumen being responsible. If a potato is comparatively rich in this substance, it will keep its shape on boiling; a cracking and falling apart indicates a deficiency of albumen. The potatoes containing most albumen being the most nutritious, everybody can determine the worth of a potato by boiling it. The best varieties are those which do not fall apart, but remain whole, on cooking.

INSTITUTE OF TECHNOLOGY STUDENT MAKES AN IMPORTANT DISCOVERY.

Boston, May 23.—Hugh K. Moore, a student at the Massachusetts Institute of Technology in this city, has made a discovery of a valuable process for manufacturing chloride of lime, or bleaching powder, by which he claims to be able to produce this article of 99 per cent. purity. More than \$3,000,000 worth of an inferior product of chloride of lime is imported every year in the face of a heavy tariff. The discoverer of this process is twenty-six years of age, son of a clergyman. He has been deeply interested in chemistry all his life, and he is in receipt of letters of congratulations from scientific men in all parts of the world who have become much interested in his discovery. A factory is being built in Rumford Falls, Me., where it will soon be in operation. Some prominent capitalists are interested in the scheme to make commercial use of the discovery.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc. Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Squibb's Diarrhoea Mixture.

(W. T. C.) See National Formulary, formula No. 263, page 98.

Milk of Lime.

(W. T. C.) Milk of lime is the name given to a mixture of lime with less water than will dissolve it or, in other words, when lime is slaked, or slaked lime is mixed with about 4 or 5 parts of water to form a thin magma, the mixture is called milk of lime.

Cough Mixture (Bureau O. D. P.)

(T. L.) The following formula taken from the Formulary of the Hospitals of the City of New York, under the charge of the Commissioners of Public Charities and Correction, is that to which you refer:

B
Syr. toluani,
Syr. pruni virg.,
Tr. hyoseyami,
Spir. aether. comp.,
Aque aa p. æq.
Mix. A teaspoonful.

For the reason that the title "cough mixture" might be applied to an infinite variety of compounds, it is recommended that the name of the institution as above (Bureau of Medical and Surgical Relief for the Out-Door Poor, Bellevue Dispensary) should be regarded as an intrinsic part of the title.

Diaphoretic Cold Cure.

(L. L.) asks if it is advisable to put up the following prescription for general sale:

Quinine sulphate.....16 grains
Camphor.....10 grains
Capsicum.....6 grains
Morphine sulphate.....2 grains
Ipecac.....4 grains
Precipitated chalk.....16 grains

Mix and make into 12 capsules. One capsule 3 times daily for two days only.

There is no doubt but this combination might prove a very desirable one in the treatment of what is popularly known as a "cold," but we do not believe that any preparation containing so large a proportion of morphine or any other potent drug should be sold indiscriminately to every person who may think he is suffering with a "cold." A remedy of this character cannot be made to meet the idiosyncrasies and peculiarities of every individual who may be afflicted and it therefore should not be put up for general sale. With the exception of quinine sulphate, the above formula is a modification of the old-time diaphoretic powders used in fevers and as an anodyne by the early Eclectic practitioners.

Registering Trade-Marks.

(F. A. D.) Trade-marks are registered at the Patent Office, Washington, D. C. The United States law provides that any firm or corporation may secure an exclusive right to use a trade-mark by complying with the official regulations of the Patent Office. The special advantage of registration is that it facilitates the pursuit and stoppage of infringements by authority of the Government. A trade-mark consists of a distinctive or special name or title for an article, or a device, design or stamp, or combination thereof, applied to merchandise, or the envelopes or packages. The mere business name of a person is not registrable as a trade-mark, nor can words that are merely descriptive of the article be registered as trade-marks. In other words, you may select as your trade-mark any non-descriptive word or words, picture, figure, autograph, monogram, or a combination of any or all of these, provided the same has not been used on a similar

class of goods. Trade-marks remain in force thirty years, and may be renewed for thirty years more. The Government fee for registering a trade-mark is \$25; the fee for registering a print or label \$5. The trade-mark must have been adopted before an application for registration should be made, and the date of adoption is the date when the labels containing the trade-mark are applied to the goods. A trade-mark cannot be registered unless it is already in use in trade with one or more foreign countries, or an Indian tribe, but this provision is usually complied with by sending a few samples of the goods, with the trade-mark affixed, to any merchant or dealer in Canada. Certain official rules of the Patent Office must be observed in making application for registration of trade-marks. You can obtain full information from the Commissioner of Patents, Washington, D. C., who will send you, upon application, the necessary blanks, etc. For information regarding label registration see March 19, 1896, Era, page 364.



ANNA C. UMLAND.

St. Paul, Minn., May 21.—Miss Anna C. Umland, daughter of George F. Umland, of the Eagle drug store, at No. 441 University avenue, corner of Arundel street, was the first and is now the only licensed lady pharmacist in St. Paul. She is only twenty years of age, but has been a clerk in her father's store for several years, and she holds three licenses from the State Board of Pharmacy as an assistant pharmacist, entitling her to all the rights and privileges of a full pharmacist, except that of conducting an establishment of her own. Under the law she is debarred from receiving the full degree until she reaches the age of twenty-one.

Miss Umland was born in St. Paul, and her education was finished in the highest department of the Jackson school. For about four years she was under the private instruction of her father, and took a full course in the Northwestern Institute of Pharmacy graduating from that institution in April, 1896. In January prior to her graduation, however, she underwent a thorough examination before the State authorities and received her license, which has twice been renewed. Those who are competent to speak say that she is exceptionally qualified in all the branches and requirements of her profession, and her intimates know that she is thoroughly in sympathy with it.

Miss Umland is refined, accomplished, unassuming, and of a charming personality. She is a lover of music, and is a proficient performer on the piano and zither. Her social acquaintance is large.

THE PHARMACEUTICAL ERA

[WEEKLY]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, JUNE 2, 1898.

No. 22.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1837.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates: U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483, NEW YORK.
Cable Address: "ERA"—New York.

CHICAGO OFFICE: 124 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL \$15	What These Manufacturers Will Do; Proprietary Association Goes to Washington \$36
CORRESPONDENCE \$17	Wholesalers Want Uniform Advance of Prices. \$37
ERA COURSE IN PHARMACY \$19	NEWS LETTERS. \$38
Inorganic Chemistry. \$19	BUSINESS RECORD. \$44
Pharmaceutical Processes. \$21	Torrey Botanical Club: St. Louis Paint, Oil and Drug Club \$45
Cinchona Cultivation and Its Pioneers. \$24	North Carolina Pharmaceutical Association; Maryland Association; BOARDS, COLLEGES, ETC. \$47
How to Push Photographic Supplies; Trials and Tribulations of the Druggist \$27	DRUGGISTS' ADVERTISING. \$48
Formaldehyde \$28	Missouri and Illinois Meetings \$51
PHARMACY \$29	OBITUARY \$51
QUESTION BOX. \$30	PATENTS, ETC. \$52
NEWS AND TRADE DEPARTMENT. \$33	NEW BOOKS. \$52
The War Revenue Bill; Drug Trade Will Protest; A Week of Talk. \$33	STATE OF TRADE \$53
Senate Proceedings in Detail \$34	MARKET REPORTS. \$54
Individual and Organized Remonstrance; Other Communications \$35	

THE ERA COURSE IN PHARMACY

Consists of lecture prepared by leading pharmaceutical educators, and published weekly in The Pharmaceutical Era. Quizzes and Examinations are conducted by mail. Question blanks upon each lecture are sent to students, and their answers duly rated are returned with corrections by the instructors.

The course is graded and covers in scope all the subjects included in the college curriculum. The course is divided into two years, junior and senior, of about 40 weeks each.

More than 1,000 Students in the junior class for 1897-98. Send for full Prospectus, now in preparation, giving details of courses, manner of conducting it and terms for tuition, etc.

Address,

THE PHARMACEUTICAL ERA,
Box 1483, New York.

The Ownership of Drugstores.

As reported in this paper last week, the Chicago Apothecaries' Society recommends that the present pharmacy law of Illinois be so amended that no one but a registered pharmacist may own or manage a drug store, provided, however, that if the property shall, through administrative proceedings or otherwise, come into the possession of the courts, it shall be managed by a registered pharmacist.

The reason for this recommendation is easily guessed. It is intended, we suppose, as a blow against department stores which maintain drug departments. This supposition appears warranted by the fact that the Society further recommends that the law be so amended as to provide that no drugs, medicines or poisons shall be offered for sale in towns of 10,000 inhabitants or over in places of business in which general merchandise is for sale.

We are in thorough sympathy with the spirit of this second recommendation, but do not like its phraseology. "General merchandise" is a very vague term. It might be made to apply to drug stores themselves, which carry various side lines, and this application is certainly not what the framers of the recommendation desired or intended.

But the first recommendation is one to which we are unalterably opposed. It certainly is ill advised, to use no stronger term. It is thoroughly unconstitutional, and we believe would be upheld by no court in Christendom. The same sort of thing was tried, but unsuccessfully, in Philadelphia a year or so ago. There is neither law, justice nor reason in the requirement that the ownership of a drug store shall be restricted to a registered pharmacist. All the law should exact, all that the public can expect or is entitled to, is that drug stores shall be managed and their operations conducted by qualified persons. The proposition of our Chicago friends, if put into effect, would prevent any one not a pharmacist from investing his money in drug store property, would shut up many a store owned but conducted legally; would break up many a partnership; would prevent a druggist's widow or children from continuing the business on which their livelihood depends, and in many ways work undeserved injury. Perhaps, if the truth were known, some of the very druggists who voted for this recommendation are in reality merely managers for non-pharmacist owners. What would become of them?

A man has a right to invest his money as he chooses, provided he injures no one. No one is injured by the investment of outside capital in the drug business. What would the druggist think if a law were enacted that he shall not invest his surplus wealth (if he has any) in the shoe business or a sugar refinery. Because he does not know how to make shoes or sugar is no reason he should be debarred from investing in these businesses. He could get some one who does know how to manage affairs.

Our Chicago friends have, we believe, acted hastily in this matter. They suffer greatly from the com-

petition of department stores, but do they remember that they themselves are illegitimate competitors of the cigar man, the confectioner, the stationer? If the department stores or any other stores violate the pharmacy law by the employment of unregistered help, the remedy lies in the strict enforcement of the pharmacy law as it now is. It is plenty strong enough.

Doctors Need Materia Medica and Pharmacy.

It has always been a criticism advanced by pharmacists that doctors are insufficiently educated in pharmacy and materia medica. The lack in this respect often leads to great embarrassment to both druggist and doctor, as well as greatly lessening the efficiency of the latter as a practitioner of medicine. If the doctor were better posted on these two subjects he would avoid those terrible therapeutics, pharmaceutical, chemic and physiologic incompatibilities which he now so frequently perpetrates.

Though this weak point in his educational equipment has been persistently attacked by pharmaceutical journals, it is rare for a medical journal to admit its existence, and still rarer that a medical college takes any steps to correct the deficiency. It is therefore with the refreshment of rarity that we read in an English medical periodical some views on this subject which are directly in line with our criticism. Our contemporary's remarks, of course, bear directly upon conditions and educational requirements as they are in England, but as they are practically as in this country, the statements made need little modification.

It is pointed out that there seems to be a tendency among the younger generation of medical practitioners to lean towards the disparagement of the use and administration of drugs. This is believed to be due to two causes.

First, the inadequacy of their student training in pharmacy and therapeutics. What are the regulations in the various universities and medical institutions regarding the training necessary to qualify a student to become eligible for examination in these subjects? Our English brother is required to know a little more than the student here, but still not enough. He has to attend a three months' course in pharmacy and three months' lectures on materia medica and therapeutics. It is not necessary that he should attend his three months' pharmacy under the control and guidance of a competent pharmacist, but can, and frequently does, during his summer vacation attend the surgery of the local practitioner, and assists him in the little dispensing he has to do, for which trifling services he receives a certificate from this registered medical practitioner stating that he has been instructed in pharmacy! Concerning this our contemporary says: "Certainly a more thorough training in this most important branch of medicine ought to be insisted upon."

The second cause of the tendency to discard drugs is "due to our leading medical journals filling their columns with surgical and pathological news, to the almost entire exclusion of treatment, pharmacy or therapeutics. The great advances made in diagnosis and in pathological knowledge are of immense service; but surely the physician's duty is not completed when he has diagnosed his case, but rather should it commence here; and every medical man should be well versed in the therapeutic action of any and all remedies that may have a tendency to alleviate and correct the abnormal conditions which he has found his patient suffering from. We certainly think that every medical student should be compelled to attend at least a six months' course in pharmacy, under a competent

pharmacist, and that attendance on a special course of lectures on therapeutics should be included in the regulations of every examining body."

Factory-Made Pharmacists.

Here are a few extracts from a circular which is being distributed to drug clerks and would-be druggists, how widely, however, we cannot state.

SUCCESSFUL REGISTRATION ASSURED.

Druggists and Drug Clerks.

Are you interested in getting registered in any particular State? If so, this may help you.

The enclosed pages are samples of my new book, "The ———," which contains the examinations of States all over the Union, comprising in all over 5,000 questions which have actually been asked at these examinations.

The questions are in the form in which they were presented, and represent entire individual tests, with the exception of the identifications, which in most cases are very simple.

In the back of the book will be found a complete list of the drugs and preparations which may be required for identification.

The success of any one is insured if he follows the instructions of this book, which are very plain.

My experience proves its value, for I passed the ——— Board within six months, and was the only successful one out of seven.

September 4, ———, I passed the ——— Board, there being only two out of forty-three who were successful.

In October, ———, I obtained a certificate from the State of ———, being one out of four of the successful candidates, twenty-three being examined at that time.

This is simply to show the value of the method which I pursued in passing these State examinations. This book will be sent, postpaid, on receipt of price, ———. Further information will be sent on application.

We omit some portions of the circular, also names and addresses, as we do not wish to encourage such an enterprise as this. The author of the scheme states that it "is indorsed by leading boards of pharmacy, and many students and clerks have taken advantage of the opportunity and successfully passed their examinations," and he quotes a letter of commendation from the president of one State Board of Pharmacy. We wonder if the "leading boards of pharmacy" do really indorse this method of preparation, and if they would knowingly pass and register candidates who had chosen this short cut.

A Sample Liquor Prosecution.

Politics makes strange bedfellows is a statement not strictly applicable to the case we call attention to, but it is close enough. In a certain Massachusetts town a few weeks ago a druggist was one of the two candidates for the postmastership. While the fight was in progress, and as an outgrowth from it came a complaint that the druggist had been selling liquor illegally. On trial of the case, not held, however, till a few days ago, after the druggist had been appointed postmaster, an employee of the druggist's opponent testified that he had taken to the drug store a customer, who had purchased the liquor, the sale of which was made the basis of the suit. The witness admitted, however, that he was influenced in this action through his connection with the other candidate for the office, and thought that if he could convict the druggist of selling intoxicating liquor it might defeat him for the postmastership. At this time, also, it is alleged that another supporter of the rival candidate approached the druggist with an offer that if he would retire from the field no prosecution would be brought. The druggist declined all overtures, kept up a hot fight and won hands down. But his opponent still had hopes of defeating his confirmation, and brought the complaint for a sale of liquor to show his unfitness for

the government office. But the complainant failed to prove the charge, and the druggist was discharged. The man upon whom the complaint depended as chief witness testified that he did not purchase any liquor either from the druggist or his clerk, and this let the bottom drop out of the case. If the druggist is inclined to vengeance, it would seem that he has material for a counter suit on the charges of perjury, subornation and the like. At any rate, this case shows what dirty tactics are sometimes employed in political controversies.

Inadequate Punishment.

There is a peculiar case now exciting interest in Massachusetts which is worth calling to general attention. In the small town of Conway a prominent citizen has for years been conducting a general store. He established a drug department in this store, and carried it on despite a warning from the board that he must be duly examined and registered. The result of his ignorance of the drug business and of his violation of the law's requirements is that a life nearly paid the sacrifice. A customer entered the store and inquired for Jamaica ginger. He was waited upon by the proprietor's son, a boy of no education in the drug business, who made the mistake of selling aconite. The customer took a large dose of the poison, and it was only by most energetic measures that his life was saved. The State Board of Pharmacy heard of the case and brought a charge against the storekeeper of keeping drugs without a State license. The defendant pleaded guilty and paid a fine of \$25.

The merchant can consider himself very fortunate in getting off so lightly. His offense is such as to warrant a very heavy penalty, and should have been made the occasion for an emphatic warning to other dealers who may be evading the law. Public safety imperatively demands that none but duly competent men shall be allowed to handle the potent agencies of life and death which constitute a drug stock.

There is a druggist in Baltimore who ought to serve time. He told a former clerk of his that if he would steal patent medicines and other drug stock from his present employer and bring the goods to him, he would buy all the clerk could secure. The clerk agreed, and has been receiving \$75 or \$100 a month for his share of the proceeds. But the robbed druggist got on to the scheme and stopped it by securing the arrest of the two thieves a few days ago. This method for securing a drug stock cheaply is not to be recommended.

BOUGIES AND SUPPOSITORIES MADE WITH WOOLFAT.—The following formulas are given by Miehle in *Ap. Ztg.*: Iodoform Bougies—Iodoform 5 gm. (77 grains); cacao butter, 5 gm. (77 grains); woolfat, 1 gm. (15 grains); to make 1) bougies of 10 cm. (4 inches) length and 3 mm. ($\frac{3}{8}$ inch) diameter. Aïrol Bougies—Aïrol, 0.25 gm. (4 grains); cacao butter, 1.5 gm. (23 grains); woolfat, 0.15 gm. (2¼ grains); to make 10 bougies of 3 cm. (1¼ inch) length, and 2 mm. (1-12 inch) diameter. Silver Nitrate Bougies—Silver nitrate, 0.1 gm. (1½ grain); cacao butter, 18 gm. (200 grains); woolfat, 2 gm. (30 grains); to make 40 bougies of 8 cm. (3 inches) length and 4 mm. (1-6 inch) diameter. No reduction of silver nitrate takes place, as is the case when this is dissolved in water, the bougies therefore retain their yellowish-white color longer. Iodoform Suppositories—Iodoform, 1 gm. (15 grains); cacao butter, 15 gm. (230 grains); woolfat, 1.5 gm. (23 grains); to make 10 suppositories. Roll the mass into a cylinder of 10 cm. (4 inches) length, upon a glass plate or a sheet of parchment paper, divide into 10 parts and press with the fingers in the form of a cone. Vaginal Iodoform Suppositories—Iodoform, 5 gm. (77 grains); cacao butter, 50 gm. (770 grains); woolfat, 5 gm. (77 grains); to make twelve suppositories.

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

LIQUORS IN THE DRUG STORE.

Chicago, May 22.

To the Editor:—

This Sunday morning the sun is shining brightly on the wicked as well as on the just, and I am bemoaning my lot as a druggist in not being out in the sunshine.

The church bells are pealing forth their calls to their flocks and the angelic saying "Peace on earth and good will to all men" is in my mind, as the store door opens, and in comes an apparently respectable looking customer who, walking up to the soda water counter, and in a low whisper says, "A lemon phosphate; please put in an ounce of whiskey."

Just think of it, what an effect this has on a so-called "anti-whiskey druggist crank" who has for nearly half a century been fighting the liquor-devil of the drug store, to thus be accosted on this pleasant Sunday morning!

With my usual well-known equanimity of temper I replied, "this is no saloon, this is a drug store. You will find a public bar-room, where you can get a drink of whiskey, if that's what you are after, right across the street."

With one of those scornful, hypocritical smiles on his face, he replied, "Thank you. I wish you, however, to understand that I do not frequent public bars; when I want a drink I get it at a drug store"—turned about, went out and slammed the door.

That this episode ruffled my previous reverie of "Peace and good will, etc."—it's hardly necessary to mention. To regain my composure I took up *The Pharmaceutical Era*, which had just been brought in from the postoffice, and one of the first articles that I noticed was the editorial headed "Druggists' Liquor Licenses," in which comments were made on the troubles and tribulations of our Colorado confreres with this two-edged sword of Damocles, constantly suspended over their heads, in selling liquors. In concluding the article you say: "When such regulations as these are necessary, it is about time the reputable druggists give up handling liquors entirely. One's self-respect is to be preserved at all cost."

The reading of this article was a balm, some consolation and great satisfaction to the writer of this, for he recalled vividly the editorial strictures that had been made by some of the pharmaceutical press in commenting on the recommendation presented by me at the late meeting of the American Pharmaceutical Association, held at Lake Minnetonka, to drop all wines and liquors from the official list of the United States Pharmacopoeia at the next revision.

Our suggestion may be ahead of the times, but it is sure to come, as it is only a question of time when this liquor question, one of the banes of the drug business, will be removed, and we no longer be the competitor of the saloon-keeper, and the sign of the mortar cease to be the beckoning finger to the tippler on the sly. "So mote it be."

ALBERT E. EBERT.

THE PATIENCE OF THE DRUGGIST.

A correspondent, J. B. Baird, of Louisville, Ky., sends us the following actual record of a day's experience in one of the drug stores of that city. These are the questions asked:

Have you a city directory? (Asked five times).
Give me change for a nickel, please.
(Newsboy) Will you give me two coppers for this stamp? (Asked twice.)
Where is Smith's office?
May I use your telephone? (Asked twenty-four times.)
Can you oblige me with some stamps? (Asked twenty-seven times.)
May I look at your morning paper?
Please give me change for a dollar?
Could I get a postal card? (Asked seven times.)
I just dropped in for a light.
May I have a few matches? (Asked five times.)
Change a quarter for me, will you? (Asked twice.)
What time is it? (Asked twice.)
I just want to sit down for a few minutes.
Will you give me a \$5 bill for silver?

Give me these stumps in your cigar gutter, please?
 Can you tell me where the health office is?
 Have you a map of the war convenient?
 Can you direct me to the recruiting station? (Asked twice.)
 Can you break a \$10 bill for me?
 How many stamps will it take to send this letter?
 Will you give me a little piece of yellow root and some plain soda in a glass? (Offers no pay, but thanks and walks out.)
 Could you tell me where Jones' blacksmith shop is?
 Can you give me a small piece of ice?
 What kind of gas are you using now?
 Five coppers for a nickel, please.
 Well, what do you think of the war, now? (Asked nineteen times.)
 Please weight these two packages?
 When do they take up the mail?
 Will you give me five two-cent stamps for ten postals?
 Four nickels for two dimes, please.
 How high is the thermometer to-day?
 Any news from the Spanish fleet yet? (Asked four times.)
 I would like to telephone to New Albany.
 What is the number of this store?
 (Excited lady) Beg pardon, I thought this was a fruit store.
 Will this paper be safe off top of the letter box?
 Could you send over to Lawyer B.'s office to see if he is in?
 I want a small string to tie up this bundle.
 I don't believe I can tie it with my gloves on; could you do it for me?
 Could you send for a messenger for me?
 May I leave these books here? (Asked twice.)
 Could you tell me whether or not the Barret avenue cars run out Fifth street?
 Have you an empty cigar box?
 May I have a drink of ice water?
 Are you certain that clock is right?
 I want you to deliver a package for me to Mr. B.
 Could you direct me to a reliable tin store?
 Do you know the druggist's name at the corner of — street?
 Have you a step ladder handy?
 I want to wait here a moment for a friend.
 Has Mr. B. been in here this morning?
 Will you please ring up Mr. — and have him call for me at H.'s store.
 Do you think the thermometer has reached 90 to-day?
 Will you kindly weigh this letter?
 Do you know the postage rate to England?
 And so on ad infinitum. Pity the poor druggist.

BOOKWORMS.—In a little work recently published, the author, Rev. J. F. X. O'Connor, says he has personally examined seven varieties of bookworm, the specimens seen of each variety ranging from three or four to thirty. In summarizing these different varieties it may be well to repeat, what is now generally known, that the bookworm is no worm at all, but the larva of certain insects, of the order coleoptera, or sheath-winged beetles. The seven varieties mentioned are, respectively: *Stodrepa panicea*, larva; *Stodrepa panicea*, full-grown insect; *Attagenus pello*, larva; *Lepisma saccharina*; *Ptinus fur*; *Dermestes lardarius*; *Anthrenus varius*, larva. Of the first named, thirty specimens were examined, these having been found in modern as well as ancient books, and under covers of leather, board or parchment. This variety, the most voracious of the destructive brotherhood, is in the larva state a soft, white, six-legged "worm," covered with bristles, about one-eighth of an inch long and sluggish in movement. Of the full-grown insect twenty specimens were found, alive and dead, in books old and new: in this state it is very small and brown in color. The *Lepisma saccharina* is described as core-shaped, of a silver-gray tint, with three-thick tails, and very rapid in its motions; it lives in books but is less destructive to them than the *Stodrepa*. The *Dermestes lardarius* is found in large numbers of books, in collections of dried plants, furs, etc., and is compared to "a microscopic hedgehog, bristling all over with rough black hairs." It leaves rougher marks upon its prey than do any of the other varieties, and prefers binding to text. Concerning the problems of discovering the bookworm, and of preventing his ravages, the author says his detection is not difficult. "Inspect closely the back of the bound volume. There you may discover little smooth, round holes that could have been made with a large needle. Sometimes these holes are at the lower end of the back of the volume; sometimes they will be found along the edges of the back. Should the back seem to be perfect, then open the book. Between the cover and the fly-leaf you may perceive a little ridge or heap of dust—red, gray or white, according to the color of the binding. If you do perceive such a ridge, the bookworm has been or is in your

book. With the point of a knife raise the paper pasted to the cover near the dust nap, and there you will find a *Stodrepa*, or *Ptinus* or *Anthrenus*. Clear him out at once; scrape the book until you are sure there are no unhatched eggs left. Prevention is another matter. Pyrethrum powder, scattered on books or shelves, camphor, fumigation by tobacco, the use of poisoned paste in binding, have been recommended, but experience shows that the only solution that promises effectiveness is to be found in a thorough overhauling of the library two or three times a year, and the individual dusting of each separate book, not with a duster, but with a cloth. Dust, poor ventilation and lack of light furnish the bookworm's element, and by the elimination of these he also may be eliminated.

TO TEST IVORY FOR GENUINENESS.—As ivory is extensively employed and costs about twelve marks (three dollars) per kilogramme, it has been attempted to substitute a cheaper substance having the same appearance. Since about twenty years an article has been worked up in this industry, which, in contradistinction to the genuine animal ivory, has its origin in the vegetable kingdom, being derived from the nut of a palm-like shrub called *Phytelephas macrocarpa*, whose fruit reaches the size of an apple. This fruit has a very white, exceedingly hard kernel, which can be worked like ivory. One hundred of these fruits only costing about four marks (one dollar), their use offers great advantages. Worked on the lathe, this ivory can be passed off as the genuine article, the resemblance being so great that it is sold at the same price. It also can be colored just like genuine ivory. M. Pasquier, of Liege, now gives a practical method in Science en Famille to distinguish the two varieties of ivory. It is the following: Concentrated sulphuric acid applied to vegetable ivory will cause a pink coloring to appear in about ten to twelve minutes, which can be removed by washing with water. Applied on genuine ivory, this acid does not affect it in any manner.—*Journal der Goldschmiedekunst*; (Sci. Am.)

GOOD OPPORTUNITIES FOR DRUGGISTS AND PHARMACISTS.

Boston, May 27.—Owing to the fact that competent men are much desired for the Massachusetts hospital corps for immediate service, an excellent opportunity is afforded druggists and pharmacists to volunteer in this line of work, which, all things considered, pays fairly good returns. A large number of young pharmacists, doctors, medical students and druggists are needed to go with the regiments, fifteen such men to each regiment. Massachusetts men through their efficiency have established such a high standard and excellence of reputation that the order which has been issued for the enlistment of as many Massachusetts men as possible is a high compliment to the profession in this State.

Men of ability stand a chance of becoming hospital stewards and of drawing a salary of \$45 a month. Other men are also well paid for their work. Applicants should bring recommendations with them from good medical authority, when they apply for positions, thereby saving much time. Small defects in the eyesight, if corrected with glasses, will be overlooked, but in other ways the men must be physically sound and able bodied.

The enlistment of men is to begin at once under orders sent by Surgeon-General Sternberg, U. S. A. Lieutenant Arthur W. Chase, at No. 37 Kneeland street, this city, and Captain William Quinton, at No. 33 Kneeland street, are enrolling names. The men, as soon as accepted here, are to be sent to Washington, where they will be detailed to the different regiments. Arrangements have been made whereby those who prefer to remain with Massachusetts troops may do so, and in some instances the men will be appointed for duty by Lieutenant Chase without their being obliged to go to Washington.

Some five or six years ago a druggist in Detroit placed half a dozen goldfish in a pond near that city. These fish have multiplied rapidly until now it is believed there are many thousands of them. Detroit newshys have been bringing them to the city and selling them at 25 cents each. There is in this a hint to druggists of a profitable side line.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblenz, A.M., Ph.M., Ph.D., F.C.S.	Oscar Oldberg, Phar.D.
Wilber G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Phm. B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M. D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college, for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 27, 1898; the second term began February 17, 1898, and will end June 30, 1898. The junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum, and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 75.

Inorganic Chemistry.

Cobalt. Nickel.

COBALT.

Symbol Co. Valence, 2 and 3. Atomic Weight, 58.6. Specific Gravity, 8.9.

Historical.—The word cobalt is of ancient origin, being found in the writings of the alchemists Valentine, Agricola and Paracelsus, though the particular substances to which it was applied are unknown. It is presumably derived from the German "kobold," a goblin or sprite supposed to haunt mines, etc., and hence came to be applied to certain false ores or minerals from which it was impossible for the old metallurgists to extract a metal. In the early part of the last century the word was used to designate the mineral employed to color glass blue, announced by Brandt in 1735 as containing a new metal, which fact was confirmed by Bergman in 1780.

Natural Occurrence.—Cobalt occurs mainly as arsenides, as CoAs_2 and Co_2As_3 , or associated with iron, or nickel arsenides, and with manganese in the form of oxid. It is also found as a constituent of meteorites.

Preparation.—Cobalt ores are first subjected to roasting and refining until the sulphur, arsenic and other impurities are largely gotten rid of and the metal is left in the form of an oxid, which is reduced by heating in a current of hydrogen, or by strongly heating certain of its compounds with carbon.

Description and Physical Properties.—Obtained by the reduction of its oxid or chlorid by means of hydrogen, it occurs in the form of a gray powder. Obtained by fusion, it resembles metallic iron in appearance, but is bluer on polished surfaces, and resembles that metal also in its properties.

It is magnetic, even at a white heat, is malleable and ductile, and is harder and more tenacious than iron. Its specific gravity is about 8.9, and its fusing point in the neighborhood of $1,500^\circ\text{C}$.

Chemical Properties.—Cobalt in powdered form oxidizes rapidly in the air, and when prepared by reduction with hydrogen, may take fire spontaneously. Polished surfaces are, however, not readily attacked in the air. It is soluble in dilute hydrochloric, sulfuric and nitric acids, and decomposes steam at a red heat.

COMPOUNDS.

Oxygen Compounds.—Cobalt forms a monoxid and sesquioxid, and their corresponding hydroxids and sulfs.

Cobaltous oxid, or cobalt monoxid, CoO , is produced as a greenish brown powder by the careful reduction of the higher oxid in a stream of hydrogen. The corresponding hydroxid, or cobaltous hydroxid, $\text{Co}(\text{OH})_2$, is obtained when a cobaltous salt is precipitated by potassium hydroxid in absence of air. This, on boiling, becomes rose red, and is soluble in excess of ammonia or ammonium salts, but not in fixed alkalis.

Cobaltic oxid, or cobalt sesquioxid, Co_2O_3 , is formed by the careful ignition of the nitrate, when it is left behind as a dark-brown powder. The corresponding cobaltic hydroxid can be prepared by the precipitation of a cobaltous salt with an alkaline hypochlorite.

A cobaltous-cobaltic oxid, Co_3O_4 , is also known, recalling the similar oxids of iron and manganese.

The monoxid and its hydroxid are basic in character, and correspond to the cobaltous salts, which are the most important and stable of the compounds of the element. The sesquioxid and its hydroxid are feebly basic in character, and behave more like the peroxids of the elements previously studied.

Halogen Compounds.—With the halogens cobalt unites to form cobaltous compounds, as CoCl_2 , CoBr_2 , CoI_2 , and CoF_2 . They are noted mainly for their bright color.

Salts of the Oxygen Acids.—Cobaltous sulfate, $\text{CoSO}_4 \cdot 7\text{H}_2\text{O}$, is prepared by dissolving the carbonate or monoxid in dilute sulfuric acid, and crystallizes in red prisms. Cobaltous nitrate, $\text{Co}(\text{NO}_3)_2$, can be obtained as a rose-red crystalline mass by evaporating a solution of the carbonate or monoxid in nitric acid. It is used mainly as a reagent in blow-pipe work. The substance known as "smalt" is a silicate of cobalt, produced by melting together an ore of cobalt with potash and sand, pouring the resulting glass into water and reducing to powder. It possesses a fine blue color, and is employed as a pigment where imperishable colors are required.

Cobaltamin or Ammoniacal Cobalt Compounds.—With ammonia the various cobalt compounds combine to form a numerous class of compounds, many of them of complex composition and generally remarkable for the colors and color changes which they display, especially in solution. For further information concerning these compounds the larger works on chemistry may be consulted.

Characteristic Reactions.—On account of the brilliant colors of its compounds, cobalt is one of the most easily identified.

tified of the elements. All of its compounds color the borax bead an intense blue, which may even appear black, if fully saturated. The cobalt salts, when in crystals, are mostly red, changing to lilac when deprived of their water of crystallization. Their solutions are mostly pink when dilute and blue when concentrated. Solutions of certain concentration may alter their color with the temperature, being red when cold and blue when hot.

From cobaltous salts the alkali hydroxids precipitate bluish basic salts, which become red when boiled, and are soluble in excess of ammonia, but not in fixed alkalis. Alkali carbonates precipitate a peach colored, basic carbonate, which on boiling becomes violet or blue, and is freely soluble in excess of ammonium carbonate.

NICKEL.

Symbol, Ni. Valence, 2 and 3. Atomic Weight 58.6. Specific Gravity, 8.9.

Historical.—The ores of nickel were originally known as "kupfer-nickel," or false copper, because, though resembling ores of copper in appearance, the latter metal could not be extracted from them. The metal was extracted in an impure state by Cronstadt in 1751, and in 1754 he proposed the name nickel for it. The existence of the new metal, however, was not generally taken as settled until the publication of the researches of Bergman in 1774.

Natural Occurrence.—In addition to its occurrence in the ores of cobalt, nickel is found as an arsenid, or kupper-nickel; as a sulfarsenid, or nickel glance; as a sulfid, or nickel blende; as a double silicate of nickel and magnesium known as garnierite; in magnetic iron pyrites; in meteoric iron, etc.

Preparation.—The most difficult part of the extraction of nickel from its ores consists in the concentrating processes made necessary by the small percentage of metal which they contain. The nickel is obtained eventually in the form of oxid or hydroxid which is then reduced by strongly heating in crucibles in contact with carbon.

Description and Physical Properties.—Nickel is a silver white or bluish white metal, and on polished surfaces possesses a brilliant luster. It is hard, nearly as malleable and ductile as iron, and can be welded. The specific gravity is 8.9 and its fusing point is 1450°C . It is magnetic, like iron and cobalt, but loses its magnetism when heated to 350°C .

Chemical Properties.—Polished surfaces of nickel are unaffected in dry air, and oxidize but slightly, even when heated in an atmosphere of oxygen. It is only slightly attacked by hydrochloric acid, but dissolves readily in nitric acid. Concentrated nitric acid converts it to the passive state, like iron.

COMPOUNDS.

The principal compounds of nickel are the nickelous salts, the metal differing from cobalt in that it does not form a series of salts corresponding to its higher oxid and hydroxid. Its salts are usually yellow when anhydrous, and greenish or apple green when in solution, or in crystals containing water.

Halogen Compounds.—A nickelous chlorid, NiCl_2 , bromid, NiBr_2 , iodid, NiI_2 , and fluord NiF_2 , are known. The first two occur in golden yellow scales, the third in iron-black scales, and the last as bluish-green crystals. The color and crystalline form vary with the presence of water in the crystals.

Oxygen Compounds.—Nickel forms two oxids and two hydroxids.

Nickelous oxid, NiO , is prepared in the form of a green, crystalline powder by strongly igniting the carbonate, nitrate or hydroxid. Nickelous hydroxid, $\text{Ni}(\text{OH})_2$, is thrown down as an apple green precipitate when a nickelous salt is treated with an alkaline hydroxid. It is soluble in ammonia, forming a solution of a blue color, and is reprecipitated on heating.

Nickelic oxid, or nickel sesquioxid, Ni_2O_3 , can be prepared by gently heating the nitrate or carbonate. The corresponding hydroxid, $\text{Ni}_2(\text{OH})_6$, can be obtained by passing chlorine through the monoxid or hydroxid suspended in water.

Nickelic oxid behaves like the peroxid of lead and manganese, releasing oxygen from nitric and sulfuric acid and chlorine from hydrochloric.

Salts of the Oxygen Acids.—Nickelous sulfate can be prepared by dissolving the metal, its carbonate or hydroxid, in dilute sulfuric acid. It is capable of crystallizing in different forms, according to the amount of water present, one of them being of the composition $\text{NiSO}_4 \cdot 7\text{H}_2\text{O}$, and isomorphous with magnesium sulfate. When mixed in molecular proportions with ammonium sulfate, the double salt $(\text{NH}_4)_2\text{Ni}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$, is formed, employed in electro-plating.

When a solution of nickel in nitric acid is evaporated, green monoclinic tables of nickelous nitrate, $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$, separate out. The nitre, carbonate, silicate and phosphate of nickel are also known.

Sulfur Compounds.—Nickelous sulfid, or nickel monosulfid, NiS , occurs native as brassy yellow crystals, in millerite, and can be prepared artificially by heating nickel and sulfur together. It is precipitated as a black powder when alkaline sulfids are added to nickelous salts in solution. A disulfid and other sulfur compounds are also known.

Chagacteristic Reactions.—When alone, nickel compounds are recognized quite readily, but their reactions are masked by the presence of cobalt.

In the oxidizing flame, nickel compounds color the borax bead violet or purple while hot, brownish yellow when cold. In the reducing flame, the bead becomes gray, and eventually colorless.

From nickelous salts, alkalies precipitate the pale green nickelous hydroxid, $\text{Ni}(\text{OH})_2$, soluble in excess of ammonia to a greenish-blue liquid, not soluble in fixed alkalies.

With alkali cyanids, the greenish yellow cyanid is precipitated, Ni(CN)_4 , soluble in excess to the double cyanid as Ni(CN)_6 . Sulfids precipitate the black sulfid, NiS .

In alkaline mixture, chlorine or hypochlorites form a black precipitate of nickelic hydroxid, $\text{Ni}(\text{OH})_2$, permitting its separation from cobalt.

PRACTICAL STUDIES.

1. Prepare a borax bead in the usual manner, moisten with cobaltous nitrate, and heat in the flame until transparent. Observe the color both hot and cold, and then repeat the dipping and heating, noting the gradual deepening of color as the saturation increases.
2. Place some zinc oxid on charcoal, moisten with cobaltous nitrate solution and heat with the blow pipe. Notice the color when cold.
3. Precipitate some aluminum hydroxid from a solution of alum by means of ammonium hydroxid, transfer to charcoal, moisten with cobaltous nitrate and heat with the blow pipe flame. What is the result when cold?
4. To solution of cobaltous nitrate add very cautiously some ammonia water, but not enough to redissolve the precipitate at first produced. Notice the color carefully, heat the test tube containing the mixture, and again observe the color. Now add an excess of ammonia and shake.
5. Repeat the last experiment in all particulars, but use ammonium carbonate instead of hydroxid.
6. Make a borax bead, saturate with ammonium nickel sulfate, and heat in the oxidizing flame until clear. Note the color, hot and cold. Heat persistently in the reducing flame, and again note the color.
7. To a solution of nickelous salt, add ammonium hydroxid, at first very cautiously, and after noting the character of the precipitate, add an excess of ammonia and shake.
8. Repeat the last experiment, but substituting solution of potassium cyanid for the ammonia water. What results?

FORMALDEHYDE FOR CORYZA AND OZÆNA.—According to Gaudin (L'Union Ph.), a few inhalations of the vapors from a 40 per cent. solution of formaldehyde through the nostrils will arrest the most violent attacks of coryza in a few hours, particularly at the beginning. In ozæna, the inhalations sensibly diminish the fetid odor of the breath within a short time, and when combined with washes, gradually cure the affection.

LECTURE No. 76.

Pharmaceutical Processes.

Regulation and Application of Heat.

Measurement of Temperature. The Thermometer.—As explained in the lecture on heat in Pharmaceutical Physics there is a difference between the quantity of heat absorbed or evolved in a given operation, and its intensity or temperature. The former is of but little importance in pharmaceutical operations and is measured by an instrument known as a calorimeter: the intensity of heat, or temperature, however, is always of importance in all operations requiring the use of heat, and is determined by means of the Thermometer.

The usual form of a thermometer is that of a glass tube of narrow bore, with a bulb or enlargement at the bottom, and partially filled with mercury, alcohol, or other liquid having considerable expansibility for small additions of heat. (Fig. 29.) The top of the tube is sealed, and if the thermometer is carefully made, the space above the mercury will be free or nearly free from air, or sometimes may contain some inactive gas, as nitrogen, or carbon dioxide. In the graduation of a thermometer two fixed points are always made use of, the freezing and boiling of water when the atmospheric pressure is equal to 760 millimeters of mercury.

To find the freezing point, the thermometer is first immersed in a vessel of crushed ice, and when the mercury column becomes stationary the tube is marked. The instrument is then transferred to a vessel where it will be surrounded by the vapor of boiling water, and a second mark made at the highest point to which the mercury ascends.

In the centigrade or Celsius' thermometer the distance between the boiling and freezing points is divided into one hundred degrees; in the Fahrenheit, into one hundred and eighty degrees; and in the Reaumur, into eighty. It follows therefore that one degree centigrade is equal to one and eight tenths degrees Fahrenheit, and to eight tenths degree Reaumur, or $1^{\circ} \text{C.} = 1.8^{\circ} \text{F.} = 0.8^{\circ} \text{R.}$

On the Centigrade and Reaumur thermometers the freezing point is marked zero, while on the Fahrenheit instrument the zero is thirty-two degrees below the freezing point. On all thermometers, temperatures below zero are indicated by placing a minus sign in front of the number of degrees. Ten degrees below zero would be marked -10° , and so on. The boiling point is marked 100° on Centigrade, $180 \div 32$ or 212° on Fahrenheit, and 50° on Reaumur.

Conversion of Temperatures.—Although the centigrade thermometer is almost exclusively used in scientific work, the common employment of the Fahrenheit thermometer renders it frequently necessary to transpose the readings of one scale into the other. Since 1°C. is equal to 1.8°F. , it follows that to multiply the number of centigrade degrees by 1.8 will give the corresponding number of Fahrenheit degrees, thus $10^{\circ} \text{C.} \times 1.8 = 18^{\circ} \text{F.}$, and, vice versa, dividing the number of Fahrenheit degrees by 1.8 will give the corresponding number of centigrade degrees, thus $36^{\circ} \text{F.} \div 1.8 = 20^{\circ} \text{C.}$ In converting temperatures, however, it must be remembered that there are thirty-two degrees on the Fahrenheit not found on the Centigrade, and these must be taken into account in conversions of temperature. Thus to convert centigrade temperatures to Fahrenheit multiply by 1.8 and add 32° , and to convert Fahrenheit to Centigrade, first subtract 32° , and divide the remainder by 1.8.

Selection and Verification of Thermometers.—The glass of a thermometer continues to contract sometimes for a year or more after the tube has been sealed. Consequently, if it has been graduated too soon after making, the contraction which takes place will have the effect of making its readings too high, frequently as much as one-half a degree.

It is possible at a slight extra cost to obtain a thermometer accompanied by a certificate attesting its correctness, or giving the rate of correction to be applied to its readings. Such a standard instrument should be at hand with which to compare others.

The best form of thermometer for pharmaceutical purposes is the kind known as the Chemical Thermometer, (Fig. 30.) having the scale engraved on the glass. By rubbing this with whiting or plumbago the lines will become more distinct and easily read.

Other forms have the scale printed on paper which is enclosed in a tube surrounding the thermometer. These are not to be recommended, as the scale is liable to become displaced, or to char by being exposed to too high a temperature.

It is of importance that the bore of the tube should be of the same diameter throughout. This may be determined by detaching a small portion of the mercury from the column and causing it to pass slowly along the stem. If the calibre is uniform throughout, the detached portion will extend over the same number of degrees at every portion of its course. If the calibre is uneven the variation should be recorded.

Melting and Boiling Points.—In addition to its use in indicating the temperatures at which pharmaceutical operations are carried on, the thermometer finds employment in the determination of melting and boiling points, both of which are of importance as criteria of the purity and identity of many substances.

The melting point may be roughly determined by immersing the thermometer in the substance, and applying heat to the latter until it becomes liquid. Another method is to coat the bulb of the thermometer with the melted substance, let it solidify, and then melt it by immersing the bulb in a liquid which is gradually heated. Both of these methods are crude and yield only approximate results. A better method is to fill a capillary tube with the melted material, which after cooling is fastened to the bulb of a thermometer, and both immersed in a bath of some kind, the temperature of which is gradually raised until the solid melts. (Fig. 31.)

Determination of Melting Point.—The method described in the text involves the use of a thermometer and a bath of liquid. The thermometer is used to measure the temperature of the bath, which is gradually raised until the solid melts. (Fig. 31.)

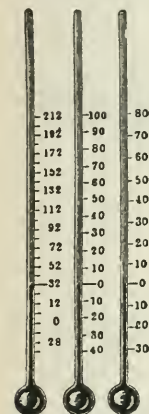


Fig. 29.—Fahrenheit, Centigrade and Reaumur Thermometers.

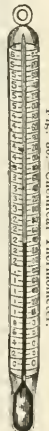


Fig. 30.—Chemical Thermometer.

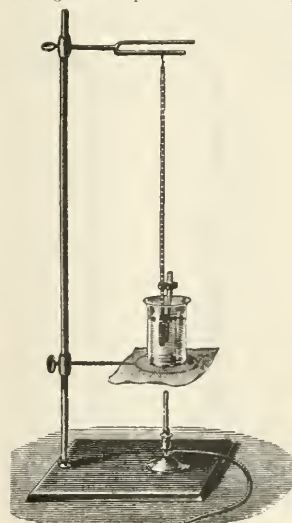


Fig. 31.—Determination of Melting Point.

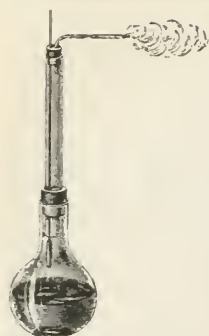


Fig. 32.—Determination of Boiling Point. The intensity of heat obtained from ordinary sources, or to modify the rapidity with which it is communicated to the object to be heated.

The Simple Blow Pipe.—The most common method of increasing the intensity of heat is to cause a more complete combustion of the fuel by increasing the supply of oxygen. The devices usually employed for this purpose are the various forms of blow pipe, operated either by the mouth or by some mechanical means. The simplest form of mouth blow pipe is a tube of 15 to 20 centimeters in length, and tapering to a fine jet which is attached to the stem at right angles. (Fig. 33.) Some portion of the blow pipe should contain an enlargement to collect the moisture condensed from the breath.

In the hot blast blow pipe the stem which carries the jet is turned upon itself in such a way that the coil is heated by the flame before the air issues from the jet, by which means its effectiveness is materially increased.

The air pressure in a blow pipe should be produced solely by the muscular contraction of the cheeks, and not by the lungs, as many wrongly endeavor to do. The cheeks being distended with air, the pressure is by the cheek muscles alone, while breathing is carried on natu-

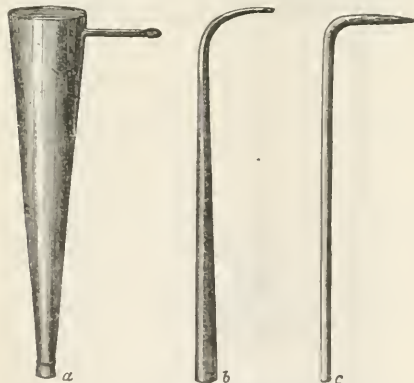


Fig. 33.—Form of Blow Pipes.

ally through the nostrils. By this means the blast from the blow pipe is continuous as long as the muscles of the cheeks can endure the strain, which, with slight practice, may be an hour or more.

The labor of using a blow pipe may be materially lessened by the attachment of a rubber tube to the mouth end of the blow pipe, the other end of which carries a mouth piece that fits the mouth, thereby decreasing the strain upon the lips.

There is but small use for the blow pipe in general pharmaceutical operations, perhaps the only occasion for its use being the qualitative assay of substances by noting

their behavior when heated on charcoal before the blow pipe flame.

According to the manner in which the blow pipe is applied, either the character or the direction of the flame, or both, may be modified. By inserting the tip just within the base of the flame a jet of air is brought directly within the zone of combustion, increasing the amount of available oxygen, changing its direction and decreasing its luminosity, and creating what is known as the *oxidizing flame*, because of the readiness with which it parts with its oxygen to other substances upon which it is brought to bear.

If the tip of the blow pipe is held outside the base of the flame, the latter is lengthened and its direction altered, but its luminosity remains unchanged. Such a flame is called the *reducing flame* because the excess of carbon which it carries readily abstracts oxygen from many other substances when they are brought within it.

The Gas Blow Pipe.—For quantitative operations, where it is necessary to strongly ignite a substance before weighing,

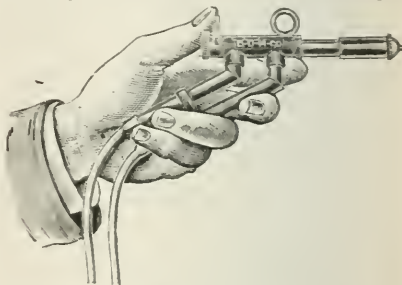


Fig. 34.—Gas Blow-Pipe.

as in most crucible operations, the gas blow pipe is used. This is a gas burner modified so that a jet of air may be forced by means of a bellows or foot blower directly into the center of the gas flame, thereby greatly increasing its intensity. (Fig. 34.) The burner is usually mounted upon a stand, having a universal joint, which permits it to be turned in any direction or to be placed at any desired angle, and is provided with the means of regulating either the gas or air supply at will.

When the combustible gas is hydrogen, and the inner tube supplies oxygen, the arrangement is known as the *oxyhydrogen blow-pipe*. The temperature produced by the oxyhydrogen flame is the highest that can be obtained by any means, except the electric arc, and is employed in the smelting of platinum and other refractory substances. When directed upon a piece of lime it heats the latter to incandescence, producing the well known "lime light," employed in stereopticons, etc.

[APPARATUS FOR REDUCING OR CONTROLLING TEMPERATURE.]

Baths, Their Objects and Kinds.—Sometimes it is necessary to adopt measures for reducing the temperature of the heat supply, or to modify the rapidity with which it is communicated to the body being heated. Vessels of porcelain, glass, earthenware, or other fragile materials are liable to sudden fracture if placed in immediate contact with the flame, or the sudden accession of heat to the contents may cause injury to that portion which is in immediate contact with the bottom of the vessel by its taking up heat faster than it can impart it to the rest of the substance, and so becoming buried.

The heat may be reduced by diminishing the supply of fuel or by lessening the draught.

The rapidity with which the heat is communicated to the body being heated is governed by interposing between it and the source of heat some substance which will take up the heat from the flame and impart it gradually to the body which is to receive it. The materials used for this purpose are water, steam, salt solutions, fixed oils, glycerin, sand, etc., and are called *Baths*, as water baths, sand baths, glycerin baths, and so on.

The useful action of a bath is two-fold; (1) By the interposition of suitable material the heat is taken up gradually from its source and imparted gradually to the object to be heated, obviating the danger of fracturing

the vessels employed and the injurious results of unduly heating that portion of the contents which are in immediate contact with its sides. (2) The temperature of the substance can never rise above the boiling point of the material of which the bath is composed. Consequently, if a proper material for the bath has been selected, the operation may be allowed to continue automatically without the constant attention of the operator to prevent undue elevation of the temperature.

The following are the baths in most common use and a description of their several qualities:

The Sand Bath.—The sand bath is a shallow, dish-shaped vessel of sheet iron, filled with clean, dry sand. The action of the bath is simply to impart the heat gradually to the vessel which is placed upon it. The sand bath does not limit the degree to which the heat may be raised, like liquids which have definite boiling points.

Instead of sand, the material may be iron filings, or any similar substance which is infusible at moderate temperatures. The degree of heat derived from a sand bath may be modified to some extent by the depth to which the vessel containing the substance to be heated is immersed in the sand. The deeper the vessel is immersed, the higher the temperature rises, and vice versa. The sand baths used in analytical operations are commonly small dishes of tinned iron, containing a thin layer of sand.

Thin plates of metal, or of asbestos board, or sheets of wire gauze are frequently used in place of sand baths, and are found very useful, especially the last named, in the heating of flasks, beakers or small evaporating dishes.

The Water Bath.—The most common form of water bath is that of a kettle-shaped vessel of copper, with a top made of rings of different sizes, so as to permit the use of evaporating vessels of different diameters. Fig. 35. This style of bath is useful for small operations only, since it is necessary to remove the vessel which is being heated to replace the

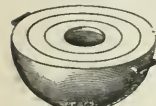


Fig. 35.—Copper Water bath lost by evaporation. A style better adapted to larger operations

is one in the form of a deep, flat-bottomed pan, with an opening near the top for adding water to replace that lost by evaporation, and a faucet near the bottom for emptying. Where the operation is to be continuous, the water bath may be connected with the water supply so that it may be renewed automatically, overflow being prevented by an outlet tube at the height at which it is desired the water shall stand.

Another device for insuring a constant supply of water is the invention of Dr. E. F. Davenport. This consists of a closed metal box, to which is attached a long coil of black tin pipe in such a manner that the steam rises into the pipe where it is condensed, and again returned to the lower portion of the metal box which serves as the bath.

Since water boils at a temperature of 100° C., when the pressure is normal, it follows that its temperature can never rise above that point. Practically the temperature of a liquid contained in an open vessel over a water bath will never rise much above 90° C., owing to the heat being lost by radiation faster than it can be imparted to the liquid. In order to obtain a temperature higher than the boiling point of water, saline, glycerin or oil baths are used.

Saline Baths.—Saline baths are made use of where a higher temperature than boiling water is desired, and are constructed in accordance with the law that a salt raises the boiling point of a liquid in which it is dissolved. The extent to which the boiling point is raised depends both upon the kind of salt which is used and the concentration of the solution, the boiling point rising as the concentration is increased. A saturated solution of common salt boils at 108.4° C., and one of calcium chloride at 179° C., etc.

Oil and Glycerin Baths.—These differ from saline and water baths only in the character of the liquids employed. They are used only for special operations, and do not present any advantages over the other varieties, except in possessing higher boiling points. Such baths must be used at temperatures below the decomposing points of the liquids which are employed, otherwise the

acid vapors which are formed may become harmful or unpleasant. Baths of fixed oil or glycerin cannot be used where the temperature rises much above 250° C.

Steam Baths.—For some of the purposes of pharmacy, especially in large operations, it is more convenient to first convert the water into steam and then use the steam as a heating agent. One advantage of this process is the readiness with which the steam may be transported to places some distance from where it is generated. Another advantage arises from the large quantity of heat which is latent in steam, and which may thus be transported from place to place at a temperature not above 100° C.

Water in passing from the liquid state to the state of steam at 100° C. absorbs or renders latent 537 heat units for every kilogram of water evaporated. Conversely, every kilogram of steam condensed to water at 100° C. will give out this amount of heat to the substance which causes the condensation, i. e., a kilogram of steam will furnish sufficient heat to raise the temperature of 537 kilograms of water 1° C., or 5.37 kilograms, from 1° C. to 100° C., etc.

Steam used as a source of heat may be applied either by passing it directly into the liquid to be heated, or by passing it into a hollow space or jacket which surrounds the vessel to be heated, like a water bath, or by causing it to traverse coils of pipe immersed in the liquid. When the steam is applied in a manner so as not to come into actual contact with the substance heated, the arrangement is known as a steam bath.

The objections to the application of steam directly to a liquid are that the bulk of the liquid is increased by the condensed steam, and that a disagreeable and noisy bumping is caused by the sudden condensation of the steam by contact with the cold liquid.

Baths of Superheated Steam.—If the steam is emitted at the ordinary atmospheric pressure, it will have the temperature of water boiling in an open vessel. If, however, the steam be confined, the temperature rapidly rises with the increase of pressure until at a pressure of two atmospheres there will be a rise of nearly 21° C. The temperature which may be reached in this way is limited only by the strength of the materials employed in construction of the apparatus.

An old application of this principle is seen in the Papin's Digester, an apparatus in the form of a boiler or strong covered kettle, fitted with a safety valve. By loading the valve, the pressure may be increased to any point that the boiler will bear, with a corresponding increase in the temperature. It is by the use of this or of similar appliances that the insoluble collagen of bones is converted to soluble gelatin or glue.

Evaporation at Low Temperatures.—It is sometimes desirable to produce evaporation at low temperatures, as in the preparations of certain galenicals, which are easily injured by heat, or in the production of sugar, and the like. This is accomplished by making application of the fact that the boiling point is lowered by decreasing the pressure upon the surface of the liquid. The heat is usually applied by means of a steam bath, and the pressure of the atmosphere decreased by means of steam pumps, connected with the vessel which contains the liquid to be concentrated. Such an arrangement is known as a Vacuum Apparatus, and is used in the concentration of fluid and solid extracts, and similar preparations.

Vessels Used to Contain Substances While Exposed to Heat.—The vessels which are principally used to contain substances while being exposed to the action of heat are Test Tubes, Flasks, Retorts, Evaporating Dishes or Capsules, Casseroles and Crucibles. They may be made of glass, porcelain, earthenware, iron or iron covered with porcelain or other glaze, or of platinum. When of fragile materials, they are purposely made thin, as such vessels are less liable to fracture from sudden changes of temperature than thick vessels, though more liable to breakage from blows.

Test tubes are tubes of thin glass, closed at one end and used, as their name indicates, for testing. They generally come in nests of various sizes, but the size most useful for general work is about 12.5 cm. in length. In using, the tube should be taken between the thumb and the first two fingers, and held slightly inclined, and so that the flame shall strike the tube below the level of the

liquid. While heating, the tube should be twisted gently so as to prevent its becoming more highly heated at one point than another, otherwise the sudden cooling will cause fracture when the cooler liquid comes into contact with the highly heated portion.

The open end of the tube should also be held away from the operator, and from all other persons, to avoid injury, which may result from the sudden spurting of hot or corrosive liquids.

Flasks are generally globe-shaped bottles of thin glass, with long necks. The bottom may be either flat or round. Chemical flasks are those which have the neck strengthened by a ring of glass so as to permit the tight insertion of a cork. Flasks of conical form and short neck are known as Erlenmeyer's, or Assay Flasks.

Flasks may be used for digesting or boiling, or they may be fitted with condensing tubes and used in the place of retorts for distilling. Their use for such purpose will be considered in the lecture devoted to distillation.

Evaporating dishes and capsules are shallow circular vessels, used to contain substances when the main object is to get rid of a liquid by evaporation, this process being favored by shallow depth of liquid and large extent of surface.

The evaporating dishes commonly used are of porcelain. They are also made of the "agate ware" previously described, or of iron enameled with a porcelain-like glaze. The objection to both of the latter is the liability of the glaze to crack and expose the iron beneath. For special purposes, or analytical use, they are frequently made of glass or platinum.

To avoid fracture, flasks and evaporating dishes should never be exposed to heat without the interposition of some form of bath, or of wire gauze, asbestos paper or similar substance.

Casserole is the name given to a deep form of porcelain dish when provided with a handle like a dipper. They are especially convenient for the boiling or evaporation of small quantities of liquid, or for the preparation of ointments or suppository masses by fusion.

Crucibles are deep, cup-shaped vessels, used to contain substances which are to be exposed to high temperatures. At the present day the only use which the dispensing pharmacist can have for crucible operations is in making ignitions, which are required in the assay of his materials. Crucibles are made of various refractory materials, but the most useful for common purposes are of porcelain, graphite mixed with clay, or of platinum. When in use they are held in position over the flame by triangles of platinum wire, or of iron covered with clay pipe stems.

On account of their costliness, platinum crucibles and dishes should be used with the greatest care. Substances easily reducible to the metallic state, as compounds of bismuth, antimony, arsenic, lead, tin, etc., should not be heated in platinum crucibles, as the reduced metal is liable to alloy itself with and destroy the crucible.

Platinum crucibles, when they become tarnished or blackened by soot, should be cleansed by rubbing them gently with sea sand, which has rounded grains, and will not scratch the surface. Common sand, which has angular grains, will not answer.

CEARIN, A NEW OINTMENT VEHICLE. Is prepared, according to Issleib, by melting together 1 part of white carnauba wax and 4 parts of liquid paraffin, and stirring the mixture until cold. Bleached carnauba wax comes into the market in snow-white blocks. It is saponified only with difficulty and is therefore very stable. Cearin, when made according to the directions, is a perfectly white, rather soft mass of homogeneous appearance. It possesses the necessary chemical indifference to furnish in this respect a real substitute for petrolatum. Ointment of potassium iodide, without thiosulphate or other reducing agent, ointment of red iodide of mercury, and ointment of subacetate of lead, made with this base, keep a year without change. The most important advantage of cearin over petrolatum is its power of taking up considerable quantities of water. While petrolatum will take up only 4 to 5 per cent. with difficulty, cearin readily absorbs 15 to 18 per cent. and can be used in many cases in which petrolatum is inadmissible. (Ber. pharm. Ges., through Ap. Ztg.)

CINCHONA CULTIVATION AND ITS PIONEERS.*

The Value of Cinchona.

Suppose the human race were threatened by some supernatural power with the destruction of all its sources of medicine except one, which would be the wisest to select for preservation? Cast over in your mind all the drugs that have by the most extended and severest trials stood the test of experience and say which is most precious to us. Very few, one is afraid, of the remedies which have come to light in the last 10 or 20 years would be included in the small number from which the final choice must be made. We should discover in that moment that our firmest faith still rested in the virtues of the drugs of our fathers; rhubarb, ipecacuanha, aloes, opium, and cinchona would never have seemed, even compared with other medicaments, so dear as at that moment. We should think of the success which each could be put, we should think of the success which had been attained in the particular uses of each, and we should think of the extent to which each was employed at the present time; and what would be the result? Consider these facts about the last named of them and then say. Sir Clements R. Markham states, in that most interesting book of his on Peruvian bark, that the total number of deaths from fever in India alone was in 1880 at the rate of 1,500,000 annually. "At least half these deaths," he goes on to say, "will eventually be prevented by putting some cheap form of the cinchona alkaloids, retail, into every pansari's shop in the country." He boldly says that there is no drug more valuable to man than the febrifuge alkaloid which is extracted from the cinchona trees. That is, of course, the opinion of one who is not a physician, but who has probably taken care to weigh his words and consult the best opinion beforehand. His remarks as to the good effect which would follow the introduction of quinine into India were in the nature of a prophecy, but have they been belied? Has not quinine proved a boon to man, wherever introduced? Look at its enormous consumption at the present day. About 300 tons of this substance are consumed annually. In America it is of the supremest value; and in fact in all the rest of the warmer climates of the earth it is indispensable, whilst even in temperate regions such as ours it is employed extensively, and has proved itself one of the safest and surest specifics there is. Can we say more of any medicine?

The reader is left to answer the question. We will tacitly assume the nature of his reply, and on this assumption pass on to the statement that a drug which holds this position should be an object of the closest study. We rather think quinine has been neglected in later years. In the laboratories of its manufacturers, of course, it receives much attention, but, outside these, medical men, chemists, and pharmacists are too much inclined to regard quinine as a familiar substance about which all is known that need be known or can be known. Especially have we noticed that there is not the general knowledge among pharmacists that there should be concerning the later stages in the history of the plant from which quinine is produced. We are not here thinking of the life history of the cinchona tree, but of the history of cinchona forests and plantations. That is the particular subject we propose to consider here. Our attention is going to be devoted for the space of a few pages to the history of the source of quinine from the time that it was first discovered to the present day; and we shall also have something to say of that source when it was only a possible one, and before it was made actually so by the researches principally of Pelletier and Caventou. On the earlier stages of that history we shall be brief, because they have been described very fully. On developments since the cultivation of the plant was conceived our account will be more detailed, and especially will it be concerned with the distinguished men who have brought the blessings of cinchona to the doors of the civilized world.

Its Discovery.

Our purpose takes us back to the discovery of the

* The British and Colonial Druggist in a recent issue presents an exhaustive history of Cinchona, which is here reprinted in its entirety as a most valuable contribution to pharmaceutical literature.

cinchona tree in South America, its native home. The introduction of the bark to Europe ought to be as familiar to our schoolboys as the legend of Romulus and Remus. The present writer had heard of the Countess of Chinchon and her connection with cinchona bark before he had put his foot behind the dispensing counter, and the boy who had not gained the same knowledge at an equally early stage of life would be the best contrast to Macaulay's schoolboy whom we could select. To the apprentice who wishes to extend his knowledge on the subject, no better book can be recommended than that of Sir Clements Markham's already named. We will give here the results of a rapid survey of this early history. The virtues of Peruvian Bark were probably almost unknown to the aborigines of South America, with the exception, perhaps, of the Indians in the neighborhood of Loxa. It was at that spot that its use was first made known to Europeans. The local name here given it was quinaquina ("bark of bark"), a form of re-duplication in name which indicates the possession of medicinal properties. The first European whom we know to have been cured of a fever by cinchona bark was a Jesuit, who in 1600 preceded millions of other white men in gaining benefit from the cinchona tree. It is a curious point that some of the Indians appear to have thought little of cinchona, though its use was known to them, and others even had a repugnancy to it. The critical period for its introduction into Europe came in 1638; when the wife of the fourth Count of Chinchon (Chinchon is a town 24 miles from Madrid) lay sick of an intermittent fever in the Palace of Lima, the vice-regal home of her husband, who ruled over Peru on behalf of Spain. The corregidor of Loxa heard of the illness and sent a parcel of bark to the palace. By tradition, says Sir Clements Markham, it is known that the particular species that cured the Countess was called "cascarilla de chahuarquera," a variety of *Cinchona officinalis*. Mr. John Eliot Howard has pointed out that the alkaloidal constituent which probably cured the Countess was cinchonidine, in which the bark she took is particularly rich.

The Countess on her return to Spain in 1640 took a supply of quina bark with her. Thus it became partially known in Europe as *Pulvis comitis*, which name was long given it by druggists and in commerce. The Countess's physician followed her from South America to Spain, and he also carried with him a quantity of bark, which he sold at Seville for 100 reals the pound. The Countess herself diffused among the people on the estate a practical knowledge of the virtues of cinchona bark, and thus formed a centre from which the report of its virtues spread abroad. Linnaeus named the bark after her, "cinchona," only, unfortunately, he misspelt the Countess's name, and this error has now become perpetuated despite the hard pleading of Sir Clements Markham for reform, and the equally earnest efforts of Pavon (see Howard's "Nueva Quinología de Pavon").

The Jesuits were the next to assist in promulgating the use of quina bark. In 1670 they sent parcels to Rome, whence it was distributed throughout Europe by Cardinal de Lugo. Hence the name "Jesuit's bark" and "Cardinal's bark." Hence also the favor from Roman Catholics and the opposition from Protestants which it received. In 1679 Louis XIV bought the secret of preparing "quinaquina" from Sir Robert Talbor, an English doctor, for 2,000 livres-d'or, a large pension, and a title. "From that time Peruvian bark seems to have been recognized as the most efficacious remedy for intermittent fevers." But down to 1714 medical men continued to champion its merits, or inveigh against its dangers, with little discrimination. The only instance preserved of the attention it received during the early period amongst literary people are its mention in the novel of Madame de Genlis, founded on the cure of the Countess and the poem of La Fontaine celebrating the cure of the Duchess de Bouillon by cinchona bark.

Early Investigators—De La Condamine and Jussieu.

After the introduction of cinchona bark to Europe in this accidental fashion, came the first attempts to obtain scientific knowledge of the source of the new medicine. The first description of the quinaquina tree is due to a famous French expedition to South America, which was undertaken for an entirely different purpose, and in which De La Condamine, Godin, Bouguer and the famous

botanist, Joseph de Jussieu, took part. This was in 1735, and the last-named visited Loxa four years later. In 1743 De La Condamine also visited Loxa, and, after obtaining some young plants with the intention of transporting them to Paris, saw them all swept overboard by a wave as his boat approached the mouth of the river Amazon. "This was the first attempt to transport cinchona plants from their native forests, and De La Condamine was the first man of science who examined and described this important plant." Before his visit to Loxa he had written on the quinaquina tree. In 1742 Linnaeus established the genus *Cinchona*, and called the plant yielding the Loxa bark *Cinchona officinalis*. It was afterwards called *C. Condaminea*, after De La Condamine, but this name was again changed to *C. officinalis*. Joseph de Jussieu, after the departure of his colleague, visited Lima, traveled over a great part of Upper Peru, and, finally, also met with misfortune, as after 15 years of labor he was robbed of his large collection of plants. This so affected De Jussieu that he returned to France deprived of reason. From 1640 to 1776 the Loxa bark was the only one met with in commerce, and the existence of the forest supplying it was seriously threatened by the reckless felling of trees which began when the demand for the bark became large.

Ruiz, Pavon, Mutis.

Soon after the dates we have mentioned, investigations began to proceed in other parts of South America. Thus Ruiz and Pavon, Spanish botanists, landed at Callao, in 1778, and began the collection of the grey bark. They afterwards explored Chile pretty thoroughly and returned to Peru. A botanical collection they sent home was lost in a shipwreck, and their journals and other collections were destroyed by fire soon afterwards. They commenced again and left for Cadiz in 1788. Mutis, another Spaniard, was commissioned in 1783 to do for Granada what Ruiz and Pavon had been selected to do for Peru and Chile. He held the office of director of a botanical expedition in Granada from 1783 till 1808. Mutis even claimed to be the first to discover the cinchona tree in Granada, and gave the date of his discovery as 1772. In the matter of cinchona pioneering Caldas was his disciple. A less distinguishable disciple was Zea, who also made researches into the cinchonas of New Granada. Thus supplies of bark from various sources were gradually made available, and we find merchants following closely on the trail of investigators into these regions whence bark might be profitably bought. The merchants of Lima speculated in bark, and brought the grey bark of Huancu into the European markets. At first in the best years, as many as 25,000 arrobas (an arroba = 25 lbs.) were exported from the province of Huancu, and some large fortunes were made, says Poeppig. In 1785 a Lima merchant devoted 2,000 dollars to the exploration of certain forests.

Ulloa, Humboldt, Caldas.

Ulloa was one of the first to point out the danger of the careless collection. As early as 1735 he reported on it to the Spanish Government, and suggested means for preventing it. Other European investigators who followed De La Condamine and De Jussieu noticed the same thing. Humboldt especially remarked on it, and cited facts which he had gained during his travels in and about 1801. This investigator is one whose name should be selected for special mention in dealing with the pioneers of cinchona cultivation. His description of the *Cinchona officinalis* is one of the earliest we have, and as an appreciation of the beauties of this plant, as well as for its scientific value, has great interest. Sir Clements Markham, in introducing cinchona into Mexico, carried into practice an idea of Humboldt's. Humboldt, too, it was who, among modern writers, was one of the earliest to visit Pitayo. He was closely followed by a remarkable man in the person of Don Francisco de Caldas, who examined the cinchona forests of Loxa, between 1803 and 1809. This botanist was a native of New Granada, and was born in 1770. He was a scientific genius, as, in a country which possessed no facilities for education, he acquired a knowledge of botany, mathematics, meteorology and physical geography.

Poeppig, Karsten, Weddell, Delondre.

Then we come to days within the memory of living men. After Ruiz and Pavon, Dr. Poeppig travelled in

Chile and Peru between 1827 and 1832. He, an authority on grey barks, speaks of the discredit into which these had fallen on account of the adulteration which speculators soon began to practise. It is said that in 1830 scarcely 1,250 pounds of bark found their way from Huancayo to Lima. In the earlier days the "cascarilleros," or bark collectors, as well as the speculators, flourished on the result of the bark trade. The former would enter the forests in parties of 10 or more with supplies of food and tools. When they came to a cinchona region they built huts and commenced work. The "cateador," or searcher, climbed a high tree, and by extraordinary natural and cultivated powers soon discovered even afar off the clumps of cinchonas, to which he led the way unerringly. From a single clump a thousand pounds of bark were often obtained, which was sent outside the limits of the forest to be dried, on the conducting of which much depended. The cascarilleros got from the speculator 2 rials for every 25 pounds of green bark stripped, and they could easily strip 300 pounds a day, thereby making \$2 as the result of their labors. The bark cost the speculator about \$4, and the price at Lima was \$16 to \$20 the arroba of 25 pounds. The native method of stripping the bark is sufficiently well described in familiar text-books. Our description here of the preliminary steps refers to the collection of grey bark—so called because of the effect produced by the overspreading thallus of various Graphides—but it applies equally well to the steps followed in the case of other species. Soon after Poeppig's commencement of investigation of plants yielding grey bark in Peru, Dr. Karsten began his inquiries into the plants of Venezuela and Colombia. Karsten was a distinguished German botanist who landed on Venezuelan soil in 1844, and traveled for twelve years in South America. In 1867, Sir Clements Markham published some of the results of Karsten's explorations.

The *Calisaya* species was the last to contribute supplies to European markets, though it was known and prized in Madrid as early as 1770, and in 1776 a German botanist named Ilkenke and a Spanish naval officer had drawn attention to the valuable forests on the eastern slopes of the Bolivian Andes. Joseph de Jussieu had also explored part of these forests. After 1820, when quinine was discovered, the virtues of *Calisaya* bark began really to be appreciated. In 1830 the Bolivian Government began to legislate on the trade in bark, but, instead of protecting the trees from wanton destruction and maintaining the forests, they interfered with trade, granted monopolies, renewed them again, and generally bungled their business. In 1850, a firm of the name of Aramayo had the monopoly of the business. They were to pay the Government \$142,000 a year for the right of exporting 7,000 quintals of bark annually, to be purchased of the cascarilleros, the "tabla" or trunk bark at \$60 the quintal, the "cannuto" or quill bark at \$30 to \$36 the quintal. These terms were so favorable to the cascarilleros, that at the end of the first year 20,000 quintals of bark arrived at La Paz. This was more than the company agreed to take, and confusion once more reigned, another company, named Blaye, rising and trying to outdo the Aramayos by offering to take all the bark. This new-comer came to grief, however, but in the two years that the two existed the Bolivian forests yielded 3,000,000 pounds of bark. Then followed more legislation, the Government taking over the trade, until in 1859 the forests were made free, and the duty reduced to 25 per cent. on the current prices, under which law \$142,000 were brought into the public treasury in 1880, being one-fifth part of the whole revenue of the Republic.

From Dr. Weddell, one of the greatest of the great cinchonologists that has lived, much of the above account is derived, and to him we are deeply indebted for our knowledge of the *C. Calisaya*. He was a French botanist, and accompanied the scientific expedition which was sent out by Louis Philippe to South America about 1845. He made a thorough exploration of the Bolivian cinchona forests, and searched those of Peru also. In part of his travels he was accompanied by Delondre, a Havre quinine manufacturer, who had landed at Islay in 1847. In the autumn of this year both left for the coast, but in 1867 Weddell set out again for South America. In the interval he had published his *Histoire Naturelle des Quinquinas*, the most important work on cinchona up to

that time, and on his second return after arduous exploration and most valuable investigation, he published a book of travel. In 1877 Weddell was a member of the Jury Clinchonomique of the International Botanical Congress at Amsterdam, and not long afterward he died in his 60th year.

Hasskari and Junghuhn.

And now we come to the period of Dutch enterprise, which began with the transportation of cinchona plants to Java, and has resulted in making Amsterdam the bark market of the world. Previous to 1870, as Van Gorkhem points out, only a single sale by auction had taken place in the Netherlands, and this was due to accident, a ship being obliged to discharge a damaged cargo of bark in one of the Dutch harbors. The result of the sale, it appears, was satisfactory, a term which would be applied by sellers to very few sales since. Before the Dutch commenced the cultivation of cinchona in Java many persons had recommended that the artificial rearing of the plants should be tried, among others, De Jussieu, Richard, Gaudichaud, Royle, Fee, Weddell, and Delondre. At last in the year 1852 Heer Pahud, the Dutch Minister of the Colonies, brought forward plans for the collection of seeds and plants in South America. Dr. F. Junghuhn was first selected to perform the task, but he soon handed over his mission to Justus Charles Hasskari, who had been the colonial botanist from 1837 to 1843, and in 1846 was engaged at the Government Botanical Gardens at Buitenzorg in Java. At the time of his appointment he was engaged in business in Dusseldorf. Hasskari left Europe in December, 1852, under a false name—assumed to throw the South Americans off the scent—for they were fiercely opposed to such ideas as he wished to carry out—and arrived at Callao at the end of January, 1853. Thence he went to Lima and spent three months in learning the language. He entered into the Peruvian Government's plans of colonization, and so was enabled to travel freely. After much toil and trouble he, in about a year's time, was able to send some seeds to the Netherlands. Several hundred young plants were accumulated by him in a little time, and at the end of August, 1854, Hasskari left Callao with these and they arrived safely at Batavia at the end of the same year. About 70 of these plants reached alive the elevation where they were to be planted. Hasskari was made the first director of cinchona culture in Java and performed his task till 1856, when, wearied by work and, perhaps, by disappointment, he returned ill to Europe.

Dr. Franz Junghuhn took his place. In May of the year that he replaced Hasskari, there were recorded at the place which had been selected for the cultivation of the plants, 43 *C. Calisaya*, 76 *C. ovata*, and 3 *C. lanceolata*, besides 86 cuttings. But inaccuracies were discovered when Junghuhn took over the work, he only reporting 63 plants in all. This botanist had, previous to his appointment as director, brought over 149 plants (Markham says 139; this was the number which Junghuhn reported to be healthy on arrival) raised from seeds in Holland, and to him is chiefly due the selection of another plantation site in the Preanger range of mountains. A third consignment had also been sent from Utrecht. All of these collections were greatly reduced, and the culture was in a bad way when Junghuhn took charge of affairs. He worked, however, with great energy, the idea of transforming the vast forest range which he had selected being a gigantic one. At the end of 1860 the number of cinchona plants in Java was 947,205, according to Markham, distributed as follows:

C. Calisaya.....7,316 plants and 1,030 cuttings.
C. lanceolata.....30 plants and 26 cuttings.
C. Pahudiana.....339,860 plants and 18 cuttings.

Besides there were 700,264 seeds in stock or sown. The last named *C. Pahudiana* was at first thought to be the *C. ovata* of Weddell, and it was cultivated largely as being hardy, but it proved worthless. In 1864 Junghuhn died, and he was buried at a central spot among the cinchona plantations, for which he had done so much. Junghuhn had vastly improved on Hasskari's methods, and he had extended the cultivation to several ranges of mountains. His successor was Karel Vessel Van Gorkhem, who held the post till 1875. Just previous to Junghuhn's death, i. e., at the end of 1863, there were, according to his successor, the following plants and seeds in Java.

In the Open Ground.
C. Calisaya, 7,408, of which 5,000 were C. Hass-karlana.
C. succirubra, 71, of which 56 were C. caloptera.
C. lancifolia, 104.
C. Pahudiana, 531,456, in which are included C. lancifolia.
C. micrantha, 1, with 12 true C. succirubra received from British India in 1862.

In the Nurseries.
C. Calisaya, 4,685, amongst which were 4,144 so-called rooted cuttings.
C. succirubra, 18 cuttings, all C. caloptera.
C. lancifolia, 147 cuttings.
C. Pahudiana, 607,920, amongst which were 55 rooted cuttings.

Besides these there were a large number of seeds which were worthless. In 1862, by Government decree, multiplication of C. Pahudiana was stopped. The Dutch Consul-General Schuhkraft, in 1864, gave great assistance to the propagation of a better species by sending capsules of varieties of C. Calisaya from South America to Holland, and in 1868 he sent seeds, and again in 1870. Other supplies were received from elsewhere, and species were exchanged with British India. It was not, however, before 1865 that the particular variety of C. Calisaya which yields the largest amount of quinine, reached Java. This was C. Ledgeriana, and from 1872, when analysis had finally established its precedence, this was the object of all attention in the Java plantations. In establishing the relative value of the species Dr. De Vrij took a foremost part. He is now, it is hardly necessary to say, the greatest living cinchonologist. With the establishment of C. Ledgeriana as the best variety, we are brought to the work of Englishmen and to British India.

(To be continued.)

HOW TO PUSH PHOTOGRAPHERS' SUPPLIES.*

BY LEO ELIEL, SOUTH BEND, IND.

The evolution incident to the introduction of elegant pharmacy has deprived the druggist of a great portion of his revenue, for the physician who formerly wrote prescriptions now carries his tablets and compressed pills and similar conveniences in his coat pocket, and in thus dispensing his own remedies he dispenses with the druggist as well. In the larger cities and trade centres the department stores have further curtailed his revenues by absorbing the trade in drug sundries, toilet articles and proprietary medicines. For this loss in trade and revenue the druggist must in some manner seek compensation or grow less numerous, for he has reduced his expenses to about the lowest possible point.

The question which confronts him then is to which of the so-called side lines shall he turn to make good this loss. This, of course, depends on his location, size of town or city.

Amateur photography, though considered a fad by some, has come to stay, and is growing. Why should not the druggist take it up and make it take the place of some of the business and profit he has been deprived of?

Every druggist has some demand for photographic chemicals, and supplies the demand. Photography as an art is based on chemistry, and it is owing to the rapid strides in chemical knowledge that amateur photography has been made possible. Hence, photographic supplies as well as chemicals are a legitimate "side" line in the drug stores.

It is not the desire or purpose of the writer to suggest what supplies the druggist who may wish to stock photographic goods should purchase. That must depend entirely on his scope of trade, territory and other considerations. The magazines and trade journals will supply addresses of the different makers of lenses and supplies, and the necessary information as to goods and discounts may be obtained by correspondence. I would suggest, first of all, the importance of the necessary knowledge required for photographing, developing, printing, toning and finishing. This may be obtained in part from one of the many amateur books on the market, and by purchasing some good hand camera, and following directions closely, become familiar with every step of photograph making. Then it would be well to learn all about the different lenses, so as to be able to talk about the uni-

versal focus, achromatic, rectilinear, wide angles, etc.; to study the different points of the different cameras, to know something of the many print papers and dry plates. Then one should seek to get on familiar terms with some of the leading photographers of the town and from them gather more general information covering the points mentioned. It would also be well to cultivate the acquaintance of some of the many amateurs, learn what they buy, etc.

Then if you conclude to try photographic goods go at it right and in a business-like way.

First of all, have a dark room in your back room, if possible; advertise this and that you will teach your customers how to develop, print and finish photographs. Display your wares in the windows and stores. Take pictures of well known objects in your town, snap shots and time exposures; show them in the windows; have a basket or holder full of such pictures on a convenient case in your store. You will be surprised to find how many people are interested. Make a careful selection of cameras at first, just a few of those best known and in use in your neighborhood. Same as to dry plates, printing paper, etc., and work up your supply business by promptly ordering such supplies as your customers may want. Then you can work up quite a business and reputation by making your own toning solutions, developing solutions, developing powders, etc. There is no limit to the possibilities in this line if started right and with the right conditions.

TRIALS AND TRIBULATIONS OF THE DRUGGIST.

Some friends of ours, who are manufacturers of perfumes, describe an amusing incident which happened in their retail department. They say:—

"We have a customer who several times has been very careful that we sold her nothing which had the slightest bit of musk in it, as she 'could not bear it' either in perfumes or soaps. In one of our boxes that we put out there is a little piece of cotton thoroughly saturated with strong tincture of musk. This lady has just been in and wants some perfume 'exactly like that which is on the cotton.' She says 'it is delightful, the sweetest thing I ever smelt,' and left her order with us to fix up some of the same kind that she could perfume her trunk with. This will certainly illustrate that musk by any other name will smell as sweet. I have never in my twenty years' experience had anything happen quite so positive as this. We, of course, can not disguise the lady or we should lose a customer."

A "Dixie Druggist" according to C. E. Perkins, Gallatin, Tenn., is expected to dispense the following:—

- 5c. Sulphurated Zinc.
- 5ct. Carbond thordic Pills.
- 5c. w o f senney Leaves for chills.
- 10c. Corbolic Acid.
- 5c. pulverize golden Rote.
- 5c. Camile flowers
- 2 Bars Keeley Cure Soap 25c.
- 10ct. Idine.
- 2 oz. Eukque Leafes.
- Ox-en-dyed (Peroxide Hydrogen),
- 5 cents Calmy flowers.
- 10c. Red Permellion.
- 10c. Carbolic Acid.
- Magnish 10c. wort.
- 5c. Curle ointment.
- 1c. Box Smith's Billed Benes.
- 1 Bottle Good-foot corgel fer Babbies.
- 5c. canfer gum.
- 5c. sinnie 5 cents.
- 1 Box emedicated cotton.
- 2 oz. Isinglas.
- 5c. Antelene.
- 1 Pack Dime and dye Black.

TROPON is an artificial albuminous food prepared by Dr. Finkler. It is a tasteless powder which keeps well and may be added to other food in any quantity desired. The albumin is derived from both animal and vegetable sources and the cost of the preparation, compared with fresh meat, is 40 to 50 per cent. less. Animal albumin is more easily digested than vegetable albumin, 6 per cent. of the former and about 35 per cent. of the latter pass through the organism undigested. The new preparation aims to supply the masses with a cheap muscle producing food, to replace high priced meats, and to furnish armies a readily prepared food in the field. (Ap. Ztg.)

FACE PERSPIRATION.—Monn recommends washing the face 3 times daily with the following mixtures: Lemon water, lavender water, mint water, tincture of myrrh, tincture of quillaya, of each 5 parts, sodium benzoate 2 parts. (Ap. Ztg.)

* Western Druggist.

FORMALDEHYDE.*

BY GEORGE L. TAYLOR.

Known also as formic aldehyde, formal, formalin, etc., is the gaseous oxidation product of wood alcohol. At a temperature of 20° C. this gas polymerises and by the reunion of two of its molecules forms para-formaldehyde; a white semi-solid body of a soapy consistency, soluble in water or alcohol.

An aqueous solution of this para-formaldehyde forms in part the commercial article. Another commercial product, trioxymethylene, formed by the reunion of three molecules of formic aldehyde, is the base of the solid product used in the form of pastilles or in powdered form as a disinfectant.

Preparation of Formaldehyde.—The process of the discoverer, Hoffman, consisted of passing the vapor of methyl alcohol, mixed with a certain proportion of air, through a tube of platinum heated to dull redness. The resulting gases were condensed in a flask, and, in addition to the methyl alcohol, small quantities of formic aldehyde were obtained.

Various modifications of Hoffman's process were brought out by other investigators, but all experienced great difficulty in obtaining the final product in any considerable quantity, and all found that the results might be rendered null by the most minute variation of any one of the factors employed.

The principal difficulties encountered were, first, the great danger of explosion caused by bringing the vapors of methyl alcohol in contact with incandescent metal. These explosions sometimes occurred in the oxidizing tube and sometimes in the tank containing the alcohol. A second obstacle was the difficulty of oxidizing a large amount of alcohol at one time.

The whole process of oxidation must be very carefully conducted, and the proportion of air and methyl vapor admitted to contact with the incandescent material must be very carefully adjusted, as if oxygen is not present in sufficient quantity, no change takes place and the product obtained is methyl alcohol, and, if oxygen is in excess, the process is carried too far, and formic acid or carbonic acid is produced.

In an apparatus which I have designed for producing formaldehyde in commercial quantities, the methyl alcohol to be converted is contained in a circular steel tank, capable of resisting heavy pressures; in the bottom of this tank is placed a coil of copper pipe, into which steam at a high temperature is admitted. By this means the alcohol in the tank is boiled, and the resulting vapor is confined until a pressure of seventy-five or eighty pounds is reached, when it is allowed to escape into an air-mixer. This mixer is so constructed that an exactly determined quantity of air can be intimately combined with the methyl vapors. From the mixer the combination of air and vapor passes with great force and velocity through a fine tube into the converter, which has been brought to a dull red heat. This converter consists of two concentric copper tubes, the space between which is filled with broken coke or other material of a similar nature. The inner tube is finely perforated with many small holes. The alcohol vapor is admitted into this inner tube, and, escaping through the perforations, is oxidized by coming in contact with the heated coke and the copper surface of the outer tube.

The gases produced in the converter pass over into the condenser. This condenser consists of a cylindrical tank or receiver, which may be of copper. It contains a coil of copper pipe, through which circulates a refrigerating mixture capable of reducing the temperature in the tank to about 0° C., at which temperature formic aldehyde condenses into a clear, very mobile liquid, which boils at 21° C., and which polymerises at 20° C.

After undergoing certain processes of purification, enough water is added to form a 40 per cent. solution.

This solution is not, strictly speaking, a solution of formaldehyde, as the pure formaldehyde polymerises the moment the temperature rises above 20° C. It is this property which renders the addition of water or alcohol necessary.

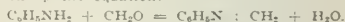
Formaldehyde Pastilles.—Paraformaldehyde, dried in

the presence of sulphuric acid, becomes less soluble in water. The insoluble part constitutes trioxymethylene, a white powder, resolving by heat into pure formic aldehyde. This powder is pressed into pastilles, and in that form used as an antiseptic or deodorant.

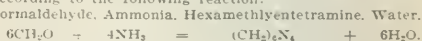
Analysis of Formaldehyde.—1. To detect its presence. Trillat's method. An aqueous solution of aniline is obtained by dissolving 3 grammes of fuchsin or magenta in 1 liter of distilled water; mix in a test tube 20 c. c. of this solution with 20 c. c. of the liquid to be assayed. In the presence of formic aldehyde a very light cloud forms after several hours. This reaction is very delicate; by it formaldehyde can be detected in a solution of 1-2000. In solutions of this attenuation, however, the reaction does not appear until after the lapse of several days.

The search for formaldehyde in alimentary substances is often futile, because it forms, with certain organic substances, combinations from which it cannot be separated.

Quantitative Analysis.—To a solution of 3 grammes of aniline in 1 liter of water is added, drop by drop, thoroughly shaking, from 1 to 4 c. c. of the solution to be tested, according to the presumed concentration. It forms a white cloud, which is finally precipitated. After forty-eight hours, the liquid is passed through filter paper, the precipitate is dried at 40° C., and its weight determined. The corresponding quantity of formaldehyde will be given by the equation:



The method employed by Dr. Lederle, chief chemist of the New York City Health Department, is based on the principle that ammonia and formaldehyde combine readily to form the compound hexamethylenetetramine, according to the following reaction:



From the amount of ammonia required to form this compound formaldehyde is calculated. An excess of ammonia should be used and the mixture allowed to stand for at least twelve hours; the excess of ammonia present is determined by means of sulphuric acid.

Method of Analysis.—Take specific gravity of the solution at room temperature.

Place 2 or 3 c. c., carefully measured, into a bottle with glass stopper; add 50 to 60 c. c. of $\frac{N}{4}$ ammonia solution; shake well and let stand for twelve hours, shaking occasionally. Then titrate with $\frac{N}{4}$ sulphuric acid, using coralline as indicator.

Calculation.—c. c. of ammonia neutralized by formaldehyde equal c. c. of ammonia used, minus c. c. of sulphuric acid.

Uses of Formaldehyde.—Formaldehyde has been put to an almost endless number of uses in the arts and sciences, but it is its great value as a disinfectant and deodorizer that has brought it into such general notice. Early in its history it was noted that it possessed strong germicidal and preservative powers, and many forms of apparatus were designed in the attempt to render it available for the purposes of household disinfection. This would seem to be a very simple problem, but in practice many difficulties were encountered. It was at first thought that it would only be necessary to evaporate a quantity of the solution in an open vessel placed over a heating lamp in the room, but it was found that when the solution became concentrated by boiling, polymerisation occurred and paraldehyde was formed, thus rendering about 70 per cent. of the formaldehyde in the solution inert and unavailable. The same result ensued when formaldehyde was evaporated at room temperature.

Trillat demonstrated that when the temperature was raised to a point considerably above that of boiling water, all of the gas in the solution was given off and rendered available for disinfection. His apparatus consisted of a strongly-constructed autoclave made of copper and provided with a heating lamp, pressure gauge and releasing valve. In operation the solution of formaldehyde was heated in the autoclave until a pressure of three atmospheres was attained, when the releasing valve was cautiously opened and the generated gas was conveyed by a small tube through the key hole into the

*Reprinted from Amer. Jour. Pharm.

apartment. Satisfactory results were obtained with this apparatus, but its great weight, the length of time required for each disinfection, and its first cost and the expense of operation have prohibited its use in many large cities when a number of disinfections are made daily. Many lamps designed to generate formaldehyde directly from methyl alcohol have been brought out from time to time, but, owing to the extreme delicacy of adjustment required, and also to the fact that varying atmospheric conditions render constant changes in adjustment necessary, none have given satisfactory results or have succeeded uniformly in generating more than a very small percentage of formaldehyde.

About two years ago I was requested to design a small portable apparatus for house disinfection. The requirements were that it was to be inexpensive in first cost and in operation, and that it should be so simple in construction and operation that it could be readily understood by a person of average intelligence. After a number of partial failures, I have succeeded in designing this apparatus, which I think fills the requirements.

It consists of a copper reservoir capable of holding sufficient formaldehyde to effect ten or twelve disinfections. Beneath this receiver, and connected with it by a tube, is a copper evaporating chamber; under this chamber is a powerful heating lamp. In operation, the lamp is lighted, and this evaporating chamber is brought to a red heat, a valve controlling the opening of the tube from the receiver to the evaporating chamber is opened, and the formaldehyde solution is allowed to trickle down in a fine stream into the heated chamber. It is then instantly vaporized, the intense heat breaks up the polymerized products, and the pure gas is delivered through the delivery tube and is conducted into the apartment.

Dr. W. H. Park and Dr. Arthur R. Guerard made a long series of bacteriological tests to determine the apparatus best adapted for the use of the New York City Health Department.

These tests were very thorough and comprehensive; they proved that formaldehyde could be depended upon to produce thorough surface disinfection; that its use did not affect colors or metals in any way, and that the cost of disinfection was not greater than when sulphur was used.

In their published reports, many investigators have stated that they are unable to get satisfactory sterilization with formaldehyde. I have investigated many of these cases, and in nearly every instance have found that the failure was not due to the lack of germicidal power in the gas, but because too much had been expected of it, and because the test organisms had not been freely exposed; one might think that a culture placed in an open test tube was freely exposed, but this has proved to be an extremely severe condition, as the gas is required to replace a closed pocket or cushion of air. The same objection can be held against the practice of exposing cultures in boxes with perforated sides or covers. Other experimenters have wrapped the cultures in filter paper, a substance which is practically impenetrable by the gas.

The method which has been generally adopted as being the most satisfactory and as giving the most uniform results is as follows:

Loosely twisted threads of cotton are steeped in virulent cultures of pathogenic, non-spore-bearing bacteria. These threads are dried and half of each thread is cut off and reserved as a check on the result. The other half is placed on a strip of sterilized paper and freely exposed for six hours to the action of the gas generated from six ounces of formaldehyde solution. The threads are then placed in tubes containing the medium best adapted for the growth of the organisms employed and kept in an incubator for from forty-six to seventy hours. If, at the end of that time, a growth of the specified bacteria employed cannot be detected, sterilization is presumed to be complete.

—Ten Salt Lake City druggists have been arrested for selling liquor without a license. The retail liquor license in that city is \$1,200 a year, and druggists must pay it if they sell without prescriptions. They want it reduced to \$100 a quarter, but the saloon men object.

PHARMACY.

SALICYLIC ACID OINTMENT.—Dr. Sternberg gives the following in articular rheumatism: Salicylic acid, oil of turpentine, lanolin, of each 15 parts, lard 55 parts. (Ztsch. f. Ph.).

GUAIAPEROL is a synonym for piperidine guaiacolate. This salt forms crystalline needles or plates, which melt at 79.8° C., and dissolve in water to the extent of 3.5 per cent. (Ztsch. f. Ph.).

DEHLIA is a proprietary remedy for coryza, and, according to an analysis by Dr. Aufrecht, is a 0.3 per cent. solution of cocaine in a mixture of equal parts of glycerin and water. (Ph. Ztg.).

RHAMNIN.—Dr. Steinbach calls by this name a fluid extract of *Rhamnus frangula*, prepared by himself by a peculiar process. It is given in constipation in doses of 15 to 20 gm. ($\frac{1}{2}$ to 2-3 oz.).

PASTE FOR LABELS ON GLASS.—The following is recommended in *Revue Scient.*: Dissolve 2 parts of aluminum sulphate in 20 parts of water and add 250 parts of a solution of gum arabic, prepared by dissolving 2 parts of gum in 5 parts of water.

COD LIVER OIL is given by Bricemoret (*Bull. Ther.*) as prepared by the following formula: Cod liver oil 400 Gm. (14 av. ozs.), syrup of tolu 200 Gm. (7 av. ozs.), tincture of tolu 10 drops, oil of clove 2 drops. The mixture must be well shaken before using. It has an agreeable taste. (Ap. Ztg.)

TURPENTINE LINIMENT.—In *Ap. Ztg.* the following formula is given: Oil of turpentine 2 parts, woolfat 1 part, water 7 parts. Dissolve the woolfat cold in one-half of the oil of turpentine, gradually add the water, with agitation, and finally the remainder of the oil. The product is homogeneous, semi-fluid and of a milk-white appearance.

ARTIFICIAL HORSEHAIR.—A process has been patented for the manufacture of imitation horsehair from vegetable fibres. The fibrous material is heated with a weak aqueous solution of alkali, washed, dyed, and, when dry, treated with an alcoholic solution of a resin. The product is elastic, and remains unchanged and odorless even when moist. (Chem. Ztg.)

HYDRONAPHTHOL, which is again of late recommended as antiseptic, is claimed to be absolutely non-toxic, soluble in 2 parts of absolute alcohol, 300 parts of hot water, 1,100 parts of cold water, 20 parts of olive oil, 2 parts of ether and 2 parts of chloroform, also soluble in alkalies. The composition of the preparation is not given, but it is suspected to be impure naphthol. (Ztsch. f. Ph.).

"COMPOSITION PUMICE STONE," so-called, consists of ground pumice stone and clay, mixed and pressed or molded in the form of bricks or cakes of different sizes, shapes, grades, or qualities of texture or grain, depending upon the use for which intended, whether by painters, varnishers, polishers, etc., in rubbing, smoothing or polishing the surface of wood, stone, marble and other substances.

"SPENT OXIDE OF IRON" is known as oxide of iron which has been used to purify coal gas by abstracting the sulphur therefrom. It is imported for the sulphur, of which it contains about 60 or more per cent. Under the influence of heat the sulphur passes off as a gas, which is caught and used in the manufacture of sulphuric acid, leaving, according to the testimony in a case where the rate and amount of duties chargeable on a certain importation of so-called "spent oxide of iron" were protested, the oxide worthless for any purpose.

PREPARATION OF TINCTURES from resins and similar drugs, as aloes, catechu, galbanum, gualac, etc., is effected, according to Mischel (*Ph. Ztg.*), very rapidly

and with as good results as by maceration, in the following manner: The resin is allowed to stand awhile with alcohol, the mixture is then heated on a waterbath under a reflux condenser. When cold it is passed through a sieve and the residue treated in the same manner as before. The alcoholic solutions are mixed and brought to the required weight or volume with alcohol. Previous powdering of the drugs is not necessary. (Ph. Rundschau).

CARBOLIC ACID PREPARED IN POWDER FORM WITH AID OF BORIC ANHYDRIDE.—When boric acid is heated to 100° C., it loses a molecule of water, forming meta-boric acid, which on further heating is converted into pyroboric acid and finally into boric anhydride. This is a colorless, vitreous mass, and dissolves in water with reconversion into ordinary boric acid. If to the fused boric anhydride, phenol is added and the mixture cooled, a crystalline mass is obtained, which is free from the deliquescence of phenol and can be readily reduced to a powder. A small proportion of boric anhydride is as efficient as a larger quantity. (L'Union Ph.).

AGING OF LIQUORS WITH HYDROGEN DIOXIDE.—The addition of a half liter of a 10 volume solution of hydrogen dioxide is sufficient to "age" 100 liters of cognac. Addition of larger quantities, up to 2 liters, does not hasten the process. The effect is the same, whether the liquor is in casks or in bottles. This new process for maturing liquors artificially has the advantage of simplicity and economy, requiring no mechanical apparatus. The action begins at once after addition, and is complete in two or three months. It is estimated that the maturation with addition of hydrogen dioxide is at least 100 times faster than without. (L'Union Ph.).

TRIONAL WATER is a solution of trional in carbonated water containing 1 Gm. (15 grains) in bottles of 330 Cc. (11 fl. ozs.). The solution also contains the principal constituents of Seltzer water. It is recommended by Dr. Habermann in cases of very obstinate insomnia caused by physical or mental overexertion, in neurosthenic conditions, and hysterics. A favorable effect is reached usually with one-half, frequently with one-third bottle, corresponding to 0.5 Gm. and 0.33 Gm. trional. The principal value of this method of administration lies, according to the author, in the following: 1. Small and yet effective doses. 2. Rapid elimination and therefore avoidance of aftereffects. 3. Possibility of prolonged continuation of the remedy because of these conditions.—In painful affections trional is of no value. (Med. Zentr. Ztg., through Ap. Ztg.)

PILLS WITH WOOLFAT AS EXCIPIENT.—The viscosity of woolfat makes it a very desirable aid in the formation of pill masses. These pills remain plastic contrary to those prepared with wax and oil, soften readily between the fingers, and disintegrate at the temperature of the body.—Mercurial pills: Concentrated mercurial ointment (75 p. c.) 10 Gm. (155 grains), powdered althea root 6 Gm. (92 grains), to make 75 pills. Each pill contains 0.1 Gm. (1½ grains) of mercury. The mercurial ointment consists of mercury, 75 p. c., woolfat, 1875 p. c., liquid paraffin, 625 p. c.—Pills of silver nitrate: Silver nitrate 0.3 Gm. (4½ grains), cacao butter 3 Gm. (45 grains), woolfat 0.3 Gm. (4½ grains), to make 30 pills. Each pill contains 0.01 Gm. (one-seventh grain) of silver nitrate. The pills have a yellowish-white color, which they retain longer than is usually the case, since a reduction of silver does not take place, when the salt is not dissolved in water, as frequently done.—Calomel pills: Calomel 3.6 Gm. (55 grains), cacao butter 4 Gm. (60 grains), wool fat 1 Gm. (15 grains), to make 60 pills. Each pill contains 0.06 Gm. (0.10 grain) of Calomel.—Potassium iodide pills: Potassium iodide 15 Gm. (230 grains), magnesium carbonate 1 Gm. (15 grains), cacao butter 5 Gm. (77 grains), woolfat 2.5 Gm. (40 grains), to make 30 pills. Each pill contains 0.5 Gm. (8 grains) of potassium iodide.—Toothache pills: Powdered opium 1 Gm. (15 grains), powdered belladonna root 1 Gm. (15 grains), powdered pyrethrum root 1 Gm. (15 grains), oil of cajuput 3 drops, oil of clove 3 drops, yellow wax 1.5 Gm. (23 grains), woolfat 0.5 Gm. (8 grains) to make 100 pills. (Ap. Ztg.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Queries From Non-Subscribers Not Answered.

W. T. Parrott, "Kingston, U. C.," should read the rules at the top of this column. This department is maintained for subscribers and their clerks.

Chlor-Anodyne.

(G. W. E.) See this journal, May 13, 1897, page 570.

Repairing Mirrors.

(O. M. A.) See this journal, August 19, 1897, page 240.

Russet Shoe Dressing.

(W. & C. Co.) See the February 18, June 17 and September 9 issues of this journal last year, pages 207, 721 and 339 respectively, also April 21, issue of the present year, page 586.

Liquor Ferro-Mangani Peptonati.

(U. S. D.) We cannot give the formula for the proprietary article. Formulas under the above title may be found in this journal August 26 and December 23, 1897, pages 272 and 957 respectively.

Syrup Hypophosphites.

(A. J. P.) The compound syrup of hypophosphites of the National Formulary, revised edition (No. 378) is a preparation of the general character you outline. Two similar formulas are given in the Era of March 4 last year, page 274.

Cultivation of Lavender.

(C. A. H.) See "Lavender, Its Cultivation and Distillation," by J. Ch. Sawyer, this journal, May 1 and June 1, 1891, pages 265 and 341, respectively. As a source of oil lavender is rarely cultivated in the United States.

Lithiated Hydrangea.

(G. W. E.) "Lithiated Hydrangea" is a proprietary preparation, each dram, the manufacturers state, representing "thirty grains of fresh hydrangea and three grains of chemically pure benzo-salicylate of Ethia." We cannot give the formula.

Preparation of Iron Peptonate.

(L. A.) In the preparation of iron peptonate (this journal, April 21, 1898, page 587) nothing is added to the clear solution produced by dissolving the precipitate in hydrochloric acid by the aid of the waterbath and constant stirring. The clear solution is simply concentrated, as directed in the formula, spread on plates of glass, and dried at a gentle heat (20°-30° C.) to yield a scale preparation. The resulting compound contains about 5 per cent. Fe₂O₃ with peptone.

Hectograph Composition.

(W. S. Y.) See this journal, February 10, 1898, page 212. Here is another formula recommended some time ago by a writer in Pharm. Post: Gelatin, 170 parts; glycerin, 1,410 parts; water, 400 parts. The mixture, after standing some time in the cold, is melted together on a waterbath and poured out with care to prevent formation of air bubbles. Addition of salicylic acid increases its keeping qualities. Before using, it is directed to moisten the surface with water and to remove the excess by spreading a paper over it. Old writing is easily removed with a sponge moistened with very dilute hydrochloric acid.

Number of Elements.

(J. L. J.) At the present time there are known to chemists about seventy substances which are believed to be elements. Of this number about forty are of medical or pharmaceutical interest. It is quite possible, perhaps even probable, that some at least of the forms of matter which are now held to be elements may yet prove to be compound bodies. Almost any work on general chemistry will give you information regarding this subject.

Foot Powder.

(E. A. S.) We cannot give the formula for the proprietary article. Most of the powders employed for tender feet contain talcum and salicylic or boric acid after the character of the "salicylated powder of talcum" of the National Formulary. Some formulas from the Era Formulary are given in the March 3 Era of the present year, page 329. Here are two or three others:

- | | |
|---|-----------|
| (1) Salicylic acid | 1 dram |
| Boric acid | 2 drams |
| French chalk | 6 drams |
| Mix and perfume with a drop of an essential oil. | |
| (2) Orris root | 1/2 ounce |
| Boric acid | 1 ounce |
| Starch | 2 ounces |
| Fuller's earth | 2 ounces |
| Powder separately and mix. May be perfumed if desired. | |
| (3) Mercuric chloride | 2 grains |
| Sodium salicylate | 2 ounces |
| Powdered talcum | 2 ounces |
| Dust a little of the powder in the socks every morning. | |

Lamp Oil for Cyclists.

(G. B.) Your difficulty in burning kerosene is undoubtedly due to the kind of lamp you use, for the lamp is just as important a factor in getting a good light as that of having a good oil. Get a good bicycle lamp to start with, keep it clean and burn in it the kind of oil it is designed to burn and you will realize both pleasure and satisfaction in the results. Almost any reputable dealer in bicycle supplies can give you the best kind of practical information upon the subject. Here are some formulas for oils recommended for certain kinds of lamps:

- | | |
|-----------------------------------|-----------|
| (1) Camphor | 1 ounce |
| Caster oil | 2 ounces |
| Petroleum | 4 ounces |
| Olive oil | 20 ounces |
| Dissolve the camphor in the oils. | |
| (2) Paraffin oil | 1 ounce |
| Colza oil | 2 ounces |
| (3) Camphor | 1 ounce |
| Petroleum | 4 ounces |
| Colza oil | 20 ounces |

Lacquer for Tin Plate.

(A. B.)

(1) Pale Tin.—Strongest alcohol, 4 ounces; powdered turmeric, 2 drams; hay saffron, 1 scruple; dragon's blood in powder, 2 scruples; red sanders, 1/2 scruple. Infuse this mixture in the cold for forty-eight hours, pour off the clear and strain the rest; then add powdered shellac, 1/2 ounce; sandarac, 1 dram; mastic, 1 dram; Canada balsam, 1 dram. Dissolve this in the cold by frequent agitation, laying the bottle on its side to present a greater surface to the alcohol. When dissolved add 40 drops of spirit of turpentine.

(2) Gold.—Clean the tin plate carefully and apply the following mixture with a brush: Dark copal lacquer, 3 parts; linseed oil, 1 1/2 parts. Dry the plates. The lacquer will not crack or lose its luster if the tin plates are bent or hammered.

(3) Alcohol, 12 ounces; turmeric, 6 drams; saffron, 3 scruples; sandarac, 3 drams; Canada balsam, 3 drams; mastic 3 drams. When dissolved add oil of turpentine, 120 minims.

(4) Alcohol, 1 quart; shellac, 4 ounces; red sanders, 1 ounce; turmeric, 2 ounces. Shake frequently for twenty-four hours, and bottle. Various colors can be given to the lacquer by adding Prussian blue, lakes, etc.

(5) Use as a body shellac or gum sandarac varnish. To make it adhere, add to it 1/2 part boric acid to 1,000

parts lacquer. Color with suitable pigments, such as gamboge, Prussian blue or carmine. Aniline colors may be used, but tend to fade. Excellent results may be attained by adding a little castor oil, which makes the lacquer much tougher.

(6) Red.—Put 3 ounces seed lac, and 2 drams aniline, color of shade to suit, into 1 pint well rectified spirits. Let the whole remain for fourteen days, but during that time agitate the bottle once a day at least. When properly combined strain the liquid through muslin.

To Stick Labels to Tin.

(A. B.) Paste for tin should not be too thin, and the tin should be free from grease. New tin generally has an oily or greasy surface, due to tallow or oil used in the plating process. The grease may be removed with an alkali or benzine, but where much labeling is to be done, it is better to slightly roughen the surface of the tin where the label is to be placed with a piece of fine sandpaper (No. 0). Here are some formulas:

(1) Add four ounces dammar varnish to 1 pound of tragacanth mucilage.

(2) Balsam of fir, 1 part; turpentine, 3 parts. Use only for varnished labels.

(3) Add 1 ounce of tartaric acid to each pound of flour used in making flour paste.

(4) Water glass (solution of silicate of soda) is recommended as a very good adhesive for this purpose, particularly if the articles are subsequently liable to be exposed to heat. Metallic surfaces should first be rubbed with emery paper before applying the paste; the label is then pressed on with the hand.

Many other formulas may be found by consulting the indexes of previous volumes of the Era.

Celery Soda.

(M. A. L.) Hiss ("Manual of Beverages") gives the following formula under the title—

Celery Phosphate Syrup.

Lemon syrup	6 fl. ounces
Orange syrup	3/4 fl. ounces
Essence violets	1/2 fl. ounce
Fluid extract of celery seed.....	1 fl. dram

Draw one fluid ounce in an 8-ounce glass, add 2 dashes of acid phosphate, fill with coarse stream of carbonated water, pour from one glass to another, and serve with straws.

Bonham gives the following for

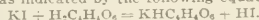
Celery Egg Phosphate.

Egg	One
Orange syrup.....	1 ounce
Pineapple syrup.....	1/2 ounce
Lemon syrup.....	1/2 ounce
Dashes of phosphate.....	3
Dashes of celery essence.....	5

Add a little cracked ice, shake, strain, fill up with fine soda stream and throw from shaker to glass. Serve with nutmeg.

Preparation of Syrup of Hydriodic Acid.

(H. L. S.) The brownish coloration you report in your sample of syrup of hydriodic acid is due to the presence of free iodine. We suggest you use the process of the present pharmacopoeia in which the hydriodic acid is developed by the reaction between potassium iodide and tartaric acid, as indicated by the following equation;



Dilute alcohol is employed as a solvent for the purpose of assisting the separation of the potassium bitartrate which is insoluble in this menstruum. Potassium hypophosphite is employed as a preservative agent, preventing decomposition of the hydriodic acid, which is caused by the separation of the iodine brought about by the influence of light and air. In the preparation of this syrup it is important that the potassium iodide be free from iodate, otherwise subsequent discoloration of the syrup will take place through liberation of iodine by the action of the acid solution of the iodate in presence of the iodide. Some writers are of the opinion that traces of hypophosphorous acid are produced in the preparation of hydriodic acid by this process. Syrup of hydriodic acid is far from a permanent preparation at best, decomposition of the hydriodic acid being the cause of the trouble.

Cement for Mending Broken Funnels.

(H. L. S.) Almost any of the so-called glass cements may be used for this purpose. Here are several formulas:

1.—A solution of potassium bichromate and glue yields a superior cement for broken glassware. The moderately strong glue or gelatin solution is mixed in a dark place or in a photographic dark room, with a small amount of concentrated solution of potassium bichromate. The edges of the fracture, which have been thoroughly cleaned, are then coated with a thin layer of the mixture, strongly pressed together and kept close by tying with twine, or in some other manner. The glass is then exposed to the sun for some hours. This causes the cement to become insoluble even in hot water.

2.—Pulverized glass, 10 parts; powdered fluorspar, 20; soluble silicate of soda, 60. Both glass and fluorspar must be in the finest possible condition, which is best procured by shaking each, in fine powder, with water, allowing the coarser particles to deposit, and then to pour off the remainder, which holds the finest particles in suspension. The mixture must be made very rapidly, by quick stirring, and when thoroughly mixed must be at once applied. This is said to yield an excellent cement.

3.—Red lead, 3 parts; fine white sand, 2; crystallized boric acid, 3. These ingredients are mixed and fused, and then reduced to a very fine powder, which may be made into a paste with a dilute solution of soluble glass, and applied as an ordinary cement, or it may be mixed with very weak gum water (just enough gum to make it adhesive); after it has been applied, the articles are exposed to a heat sufficient to melt the fusible glass, which is formed by the union of the three ingredients.

4.—Two parts of isinglass are soaked in distilled water until soft; the water is then poured off, and as much alcohol added as will cover the isinglass, and the whole heated until solution takes place; 1 part of mastic is then dissolved in 3 of alcohol, and the two solutions mixed; 1 part of gum ammoniac is then added, the whole well shaken and evaporated in the waterbath until a thick glue-like mass is produced, becoming a stiff jelly on cooling. When required for use, the vessel containing the cement is placed in hot water or in an oven, and the cement applied by means of a brush. It hardens in 24 hours.

Dividing Glass Tubing.

(H. L. S.) There is no better method for dividing small glass tubing into lengths than that of first nicking it with a file, then grasping it in both hands, placing the thumb nail against the glass opposite the nick, and then breaking the tube by such a movement as would be required to bend the tube at the nick. If the material were flexible, at the same time pulling on the tube in opposite directions. The tube breaks off squarely. A tube of large diameter is divided by scratching it with a file, then cracking it by applying to the scratch a small point of hot glass, or by means of a hot wire curved to partly encircle the tube.

Workshop Receipts says, to cut glass vessels neatly, heat a rod of iron to redness, and having filled the vessel with oil of any kind to the exact height you wish it to be cut, proceed very gradually to dip the red hot iron into the oil, which, heating all along the surface, the glass suddenly chips and cracks right round, when you can lift off the upper portion clean by the surface of the oil. If a tube is required to be cut, notch the tube at the point where it is to be divided with the edge of the file, or of a thin plate of hard steel, or with a diamond; after which press upon the two ends of the tube, as if to enlarge the notch, or what is better, give the tube a slight smart blow. This method is sufficient for the breaking of small tubes. Many persons habitually employ an azate, or a common flint, which they hold in one hand, while with the other they rub the tube over the sharp edge of the stone, taking the precaution of securing the tube by the help of the thumb. For tubes of great diameter, employ a fine iron wire stretched in a bow, or, still better, the glass-cutter's wheel; with either of these, assisted by a mixture of emery and water, you can cut a circular trace round a large tube, and then divide it with ease. When the portion which is to be removed from a tube is so small that you cannot easily lay hold of it, cut a notch with a file, and expose the notch to the point of a candle

flame; the cut then flies round the tube. A good plan of cutting glass is to make use of a piece of iron heated to redness, an angle or corner of which is to be applied to the tube at the point where it is to be cut, and then, if the fracture is not at once effected by the action of the hot iron, plunge suddenly into cold water. After having made a notch with a file, or the edge of a flint, you introduce into it a little water, and bring close upon it the point of a wire, previously heated to the melting point. This double application of heat and moisture obliges the notch to fly round the glass. Glaziers use for cutting glass a diamond splinter mounted in a holder.

Crushed Fruits.

(H. L. H.)

Strawberry.

Strawberries, three small boxes.
Sugar, granulated 4 av. pounds
Water 2 pints

Remove the calyxes from the fruit, wash with running water, mix with the sugar, either leaving the fruit whole or breaking it by trituration, add the water, bring the whole to a boil and boil for 5 minutes, stirring constantly. The boiling may be omitted, the fruit being crushed and stirred into the solution of sugar in water.

This will suffice for most fruit, pineapple being an exception. The latter is to be pared, washed and grated, mixed with syrup, and brought to a boil—not boiled.

One of the following formulas may also be employed ("Manual of Beverages"):

Raspberry or Strawberry.

Take a quantity of thoroughly ripe fruit; rub or press the fruit to a pulp through a hair sieve into an earthen or stoneware pan; add 4 av. ounces of sugar for each pound of fruit, mix thoroughly, put into bottles, heat, bring to boiling, and boil for a few minutes.

Peach.

Select ripe, freestone peaches, wash and slice them up, skin and all; add a little water; place on the fire, and stir constantly until reduced to a pulp; rub and press this through a coarse hair sieve into an earthen or stoneware pan, and add 4 av. ounces of sugar for each pound of fruit, and complete as in the foregoing.

Pineapple is to be prepared by peeling and grating, adding sugar and heating as before.

The following formula has also been recommended:

Select sound fruit, remove calyxes (if strawberries), and wash on a strainer; when water has drained off, pulp the fruit, add an equal amount of crushed loaf sugar, and preserve by adding to each pound of mixture $\frac{1}{2}$ fluid ounce of solution of salicylic acid. Pineapples are to be pared and grated, and do not require washing as above. To this mixture must be added syrup before using.

Some of the fruits may be prepared similar to the following:

Cranberries 2 pints
Water $2\frac{1}{2}$ pints
Sugar 2 av. pounds
Solution of citric acid $\frac{1}{2}$ fl. ounce
Soda foam, about 1 fl. ounce

Wash the fruit, place in a pan or kettle, add the water, apply heat, allow to boil for 5 minutes, stirring frequently; add the sugar, dissolve, add the solution and soda foam, and finally enough solution of salicylic acid to preserve.

EXEMPTION FROM PAYMENT OF SPECIAL TAX ON MEDICINAL COMPOUNDS AND PHARMACEUTICAL STILLS.—Manufacturers of medicinal compounds, by use of tax-paid spirits in combination with drugs, are entitled to exemption from special tax granted to apothecaries by section 3240 Revised Statutes, when they sell such compounds only under labels specifying the diseases for which they are held out as remedies. The Commissioner of Internal Revenue, who formulates this statement, in reply to a query addressed to his department regarding liability to the payment of special tax, further says that the use of a small pharmaceutical still of five gallons' capacity, in the treatment of these compounds of tax-paid spirits and drugs, would not involve the manufacturer in liability under the revenue laws; nor would the manufacturer of the still be held to the payment of special tax on the still of this capacity furnished for this purpose.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, JUNE 9, 1898.

No. 23.

ENTERED AT THE NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published every Thursday, at 106 Fulton Street, New York,
By D. O. HAYNES & Co.

Subscription Rates:
U. S., Canada and Mexico, \$3.00 per annum.
Foreign Countries in Postal Union, 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483, NEW YORK.
Cable Address: "ERA"—New York.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL..... 855	Fatalities; Drug Clerks..... 876
The War Revenue Bill..... 857	Play Baseball..... 876
CORRESPONDENCE..... 857	Penal Code Holds Over..... 885
ERA COURSE IN PHARMACY..... 859	Charter; Drug Stores as Saloons; Patent Medicine Litigation; Park Sult; American Chemical Society..... 877
Inorganic Chemistry..... 859	NEWS LETTERS..... 877
Pharmaceutical Processes..... 861	BUSINESS RECORD..... 885
Cinchona Cultivation and Its Pioneers..... 864	OBITUARY..... 886
French Pharmaceutical Affairs..... 866	Another New Element..... 887
Scientific Notes from Schimmel's Report..... 867	German Apothecaries Meeting; Torrey Botanical Club..... 888
Sodium Phosphate Solution..... 869	Minnesota Association; N. W. D. A. & P. A.; Pennsylvania Association..... 889
PHARMACY..... 870	Texas and Kansas Associations..... 890
QUESTION BOX..... 872	Boards of Pharmacy..... 891
NEWS AND TRADE DEPARTMENT..... 875	BOOK REVIEWS..... 891
Druggist Spaeth in Trouble; Flag Raising; Zagat Assignments; Dr. Paquin Wins..... 875	DRUGGISTS ADVERTISING..... 892
Druggists' League in Good Shape; Socialists Want a Drug Clerks' Alliance; \$10,000 Prize for Chemists; Responsibility for	STATE OF TRADE..... 893
	MARKET REPORT..... 894

THE ERA COURSE IN PHARMACY

Consists of lecture prepared by leading pharmaceutical educators, and published weekly in The Pharmaceutical Era. Quizzes and Examinations are conducted by mail. Question blanks upon each lecture are sent to students, and their answers duly rated are returned with corrections by the instructors.

The course is graded and covers in scope all the subjects included in the college curriculum. The course is divided into two years, junior and senior, of about 40 weeks each.

More than 1,000 Students in the junior class for 1897-98. Send for Free Prospectus, now in preparation, giving details of courses, manner of conducting it and terms for tuition, etc.

Address,
THE PHARMACEUTICAL ERA,
Box 1483, New York.

THE STAMP TAX.

The provisions which apply to the drug trade, included in the "Act to Provide Ways and Means to Meet War Expenditures," as the bill leaves the Senate, are as follows:

WHAT IS INCLUDED.—For and upon every packet, box, bottle, pot, phial or other inclosure containing any articles, substances, preparations or compounds, except food products and preparations otherwise provided for in this act, that are made and sold or removed for sale under patent right, trade mark, or any name or designation not open to general use.

RATE OF TAX.—5-cent articles, $\frac{1}{4}$ cent.

10-cent articles, $\frac{1}{2}$ cent.

25-cent articles, 1 cent.

50-cent articles, 2 cents.

75-cent articles, 3 cents.

\$1 articles, 4 cents.

Over \$1, 2 cents for every additional 50 cents of value.

The same rate applies to perfumery and cosmetics and other similar articles.

Chewing gum and its substitutes, 4 cents on each dollar package of retail value.

GOODS IN STOCK.—Articles on hand on the 1st of July shall be subject to the tax, but dealers who are not manufacturers will not be required to affix the stamps until the article is sold at retail.

PENALTY for evasion of stamp taxes, fine of \$500, or imprisonment for six months.

What Druggists Must Do to Protect Themselves.

The proposed internal revenue stamp tax will apply to all patent medicines and toilet goods. The majority of manufacturers announce their intention to increase the prices of their preparations. This will be done either by advancing the list prices or by making a separate charge on invoices to cover the stamp expense. This additional charge will be passed on by the jobber to the retailer, and the tax will be saddled upon him, and he cannot afford, under present trade conditions, to bear it.

The only thing for the retail druggist to do, is to get it out of the consumer. In some cases this will be impossible, but in some instances it can be done. A gentleman well posted on the drug trade, of keen perception and clear insight, expressed in an interview the other day some views upon this subject which are worthy of thoughtful consideration. He pointed out that while this stamp tax seems to be a hardship upon the retail druggist, it is possible that it may prove a blessing in disguise. This tax will raise the retail price of patent medicines 4 per cent; this is equivalent to an average of 6 per cent, on the jobbing price. Very few of the proprietors will stand the tax, and the goods now sold as low as \$7 a dozen will undoubtedly be increased to \$7.50, while the tendency will be to raise dollar goods to even a higher figure. This cutting down of the retail profit will remove the tendency to cut, because it takes away the temptation.

It was that big margin of profit between the dozen price and the retail price that called the attention of the cutters to these goods, with the added knowledge that the retail price was well established in the minds of the public. Farther than this, this tax will undoubtedly have a tendency to reduce the number of patent medicines, consequently, will be a benefit to the retail druggist, as he will not have to carry so many in stock. This kind of legislation is beneficial only to the large proprietor who has the money to put into advertising, and whose goods are in a strong enough position to enable him to raise his prices. But above all, this advance in price on patents will stimulate druggists to push their own preparations.

There are many who believe that this stamp business will revolutionize the patent medicine business, that it will kill the weak ones and strengthen the strong ones. It will undoubtedly reduce the number of these preparations, and while it seems to be a hardship upon the drug trade, and a piece of unjust legislation it may result in regulations that will really benefit the druggist.

The druggist may derive some consolation from the hope that this tax will eventually benefit the retail drug business, but in the meantime he knows he must pay the tax. To do this he must raise the retail prices. On goods which are now sold at cut prices, this is, we believe, comparatively easy to do, though on patent medicines which are sold at full prices he will undoubtedly find it very difficult, perhaps impossible. On cut goods he should not be satisfied with adding simply the cost of the tax stamp, but should grasp the opportunity to raise the price as much as he can, if possible to full rate. This will help him out on the others, where he must lose the tax.

Object of the Era Course in Pharmacy.

The period when an apprenticeship of three or four years was a sufficient preparation to enable one to practice pharmacy on something like equal terms with his competitors in the same calling has passed away forever. At the present day it is not possible to gain a competent knowledge of the theory and art of pharmacy from the simple routine of shop duties, or from the desultory and haphazard reading of text books.

While the educational opportunities of the apprentice have been lessened, his educational obligations have materially increased. The almost complete transfer of the production of galenicals and of small chemicals into the hands of the large manufacturer has deprived the pharmacist's assistant of his most valuable means of self-improvement, while the enormous multiplication of therapeutic agents of complex composition and great physiological activity have imposed a greater responsibility, and require for their safe and accurate dispensing a more complete and thorough knowledge of pharmaceutical science than ever before.

It is not possible for the student to gain this special information and intellectual training without assistance. It is not sufficient merely that he be supplied with certain books and be set to reading them. If it were possible to educate oneself in this way, colleges and universities would not be necessary, since the student might purchase a library of text books for a tithe of the cost of a college course, and by reading it become a scholar. Universal experience, however, has shown that such a method of education is not possible, that the student must have the supervision and direction of a competent instructor, not once or

twice, but constantly, and that to keep him at work, and to get the best work out of him, he must have the stimulus of regular recitations, and have his progress periodically tested by examinations.

The student who deludes himself with the idea that he can obtain a modern education without these aids may start with the best of intentions, and for a while pursue his studies quite industriously, but, lacking the means of testing his progress, with no one to direct him in the right path or show him the way when he loses it, sooner or later his interest will begin to flag, his reading will become more and more irregular, and most likely will at length cease altogether. Even should he persist by an extraordinary effort, his knowledge must be obtained at the expense of an enormous waste of time and energy, which might have been avoided had his efforts been properly and wisely directed. It is such a disastrous ending, or such a waste of time and energy which the Era Course enables the earnest student to avoid. It affords him a course of instruction which has been prepared by educators of the highest ability, and supplies that systematic direction of his studies which is imperatively necessary; it spurs him to constant endeavor by means of regular recitations and examinations, and by a judicious offering of valuable prizes, stimulates him to put forth his best efforts. It supplies all of this at a cost which is but little more than nominal, and, last but not least, it brings him into touch with the leaders of pharmaceutical thought, and with a large and enthusiastic body of fellow students.

To those whose limited means or business circumstances prevent their attending a college of pharmacy, it affords an unequalled opportunity for gaining a sound and systematic pharmaceutical education, not only such as will enable them to pass the examinations of a board of pharmacy, but also to practice successfully as pharmacists. For those who are intending to enter a college of pharmacy it is invaluable as a preparatory course, enabling them to make and maintain a high rank in their classes, while for college students it will be found an excellent auxiliary to the regular lectures and quizzes. For those who have graduated and for the veteran pharmacist, it affords a golden opportunity for review, and in its series of lectures upon special topics it presents an important lot of information upon live business matters which no progressive pharmacist can afford to ignore.

The opinion of the New Jersey State Pharmaceutical Association is that manufacturers and jobbers should not saddle all the revenue stamp tax upon the retail druggist. This opinion is expressed in the following resolution, which the association has sent to the National Wholesale Druggists' Association and the Proprietary Association:

WHEREAS Our country being engaged in a war that will probably require large sums of money, and that when the stamp tax as the result of the war of the rebellion was removed, the retailers of the country gave valuable assistance in having it removed, but the proprietors retained the total amount in addition to the fact that at that time the prices of their materials were on a war basis, and having since been materially reduced, they should now bear their proper proportion; therefore be it

RESOLVED, That we are willing and ready to bear our just proportion of the proposed stamp tax, but we emphatically protest against the proposition of the manufacturers and proprietors to saddle their proportion upon the retailers, who in the present condition of trade are much less able to bear it.

THE WAR REVENUE BILL

Passed by the Senate on June 4—
Now Goes to a Conference
Committee.

Schedule on Proprietary Preparations Broadened to Include Everything Except Food Products—High Tax Rate Maintained.

After nearly a month of talk the bill to provide ways and means to meet war expenditures was passed by the U. S. Senate on Saturday evening, June 4, by a vote of 45 to 28. The necessary course for the measure to take after its passage by the Senate, was to go to the House for action on the senatorial amendments and then to a conference committee for the adjustment of such differences as might still remain between the Senate and the House. How long this will take cannot be definitely predicted, but it is hoped in business circles that final enactment may be reached within a week or ten days from the day of passage by the Senate. In its present shape the bill approximates probably very closely the final form it will take, and business men may judge therefore with some degree of accuracy how their business will be affected.

At the last moment on Saturday several amendments to the bill were offered, and incorporated in it as passed. One of the most important of these was an amendment offered by Senator Chilton to enlarge the scope of that section which places a graded stamp tax on proprietary medicines, perfumes, cosmetics, etc., so as to include all articles which are manufactured or sold under a patent right or trademark, except food products. The wording of this amendment, which takes the place of the paragraph on medicinal proprietary articles and preparations in Schedule B, is as follows:

"For and upon every packet, box, bottle, pot, phial or other enclosure containing any articles, substances, preparations or compounds, except food products and preparations otherwise provided for in this act, that are made and sold or removed for sale under patent right, trademark, or any name or designation not open to general use."

The rate of taxation on such articles remains the same as in the draft of the bill reported out by the Finance Committee. That is:

On five-cent articles, one-fourth of one cent; on ten-cent articles, one-half of one cent; on twenty-five-cent articles, one cent, and one cent additional for each twenty-five cents added to the selling price (retail) of the article.

The paragraphs referring to perfumery, cosmetics, and other similar articles, and to chewing gum and substitutes, remain the same as in the draft of the bill given in a previous number of The Pharmaceutical Era.

The most important of the other amendments make the following provisions: Requiring a one-cent stamp to be affixed to every ticket sold for a berth in a sleeping-car or a seat in a parlor car. Placing an import tax of ten cents a pound on tea. Imposing a yearly tax of \$10 on manufacturers of "mixed flour," and requiring packages of mixed flour to be so marked. The amendment for the taxing of mixed flour, offered by Senator Mason, explains "that for the purpose of this act the words 'mixed flour' shall be understood to mean the food product made from wheat and mixed, blended, or compounded with ground corn or other foreign substances, or with the manufactured product of any grain other than wheat."

The object of this amendment clearly is to compel the distinction of adulterated from pure flour, and to encourage the making of the pure product.

After the passage of the bill Senators Allison, Aldrich and Jones were appointed conferees on the part of the Senate in case a conference should be required with the House of Representatives.

During the week in the Senate, although a great deal of talk was indulged in, almost no change was made in

any part of the bill affecting the drug trade until the day on which the measure was passed. The paragraph dealing with stocks on hand when the measure goes into effect remains as already reported. Dealers who are not manufacturers will be held to comply with the act by placing the proper stamps on the articles taxed when such articles are sold at retail. The penalties for evasion of the stamp taxes remain as originally fixed, \$500 fine or six months' imprisonment.

These things are not likely to be changed by any action of the Conference Committee.

VIEW OF THE RETAILER, THE JOBBER AND THE MANUFACTURER.

THE RETAILER MUST PAY IT.

Bellefontaine, Ohio, May 31, 1898.

To the Editor:

"Catch 'em comin' or goin'" is the lot of the poor retail druggist. This revenue tax got them when it left a few years ago, and now strikes them hard amidship when it returns. Better had it been for all if it had not been taken off. We got no rebate then. Price of patents advanced, many of them by jobbers, since that time until now. It will cost me over one hundred dollars to restamp my stock on hand, from which I will not receive a penny by way of reimbursement.

If a poor black man buys a box of Dr. Williams' Pink Pills for Pale People, I cannot ask him to pay 52 cents for the box which has printed on it 50 cents, or argue with him that the government must have this 2 cents to carry on a most righteous war for the benefit of a brother who is of a lighter shade in color than he. Or suppose a rich man wants Pierce's Pellets, can I ask him 26 cents for a box? Well, not much, nor will my competitors. We are not of that type. We will simply pay the tax ourselves, although it will cost in the aggregate nearly a thousand dollars.

I do not consider the city pharmacist competent to judge in this case. He likely needs only a bottle or two of a kind, and very few kinds of patents, as he can supply himself at once. But we must buy largely and hold in stock for irregular demand.

I see by the Era that many manufacturers propose to raise their wholesale price. How this is to help the retailer I cannot see, as we must still sell at a dollar or whatever the printed price is. But I haven't much fear of advance in price, as most of them have it up to the maximum limit now. Anything further will react against the sale of the article.

You editors in your last issue seem to think because the Bellefontaine druggists have the good sense to get the full price we ought to therefore walk up and pay this tax willingly. Well, I suppose we will, willingly or unwillingly. But it don't seem hardly fair for us to pay for the goods on hand which possibly were bought last year and will never be sold.

Yours truly,

A. C. WALLACE.

WILL NOT INCREASE THE PRICE.

San Francisco, Cal., May 31, 1898.

To the Editor:

In reply to your circular letter of recent date, it is our present intention to stand the burden of the stamp tax ourselves, by stamping all our goods, from the date it goes into effect, without increasing our price to druggists. We trust, however, that yourselves and others will succeed in getting the tax reduced from 4 to 1 per cent., and as soon as the law has passed, we may send out a circular to the trade, announcing our intention in the matter. We trust the retail druggists will appreciate our desire to shoulder the burden, rather than to throw it onto them, as we do not believe that where an article retails at 25c. or 50c. a bottle, that the druggist can expect to collect 26c. or 52c., as the case may be. A tax of 4 per cent. on the retail price of our goods will certainly be very unjust to us, as that is about all the profit we make on same, and the burden should be more equitably distributed, and the Government should not practically confiscate the business of any one concern.

Yours truly,

CALIFORNIA FIG SYRUP CO.,

Per R. E. Queen.

CALLS IT A CURSE.

Chicago, May 30th, 1898.

To the Editor:

The very unjust proposed revenue stamp tax on our productions would have to be borne wholly by us manufacturers. Our retail prices are fixed and cannot be changed. We should, if this law is passed, be compelled to allow our wholesale agents an extra 50 cents per dozen for what they have on hand, and let them stamp it as they sell it. I have written to Senators Culom and Mason, and also, being a Vermonter by birth, to Senators Morrill and Proctor, fully on the subject of this unjust stamp tax feature of the War Revenue bill, and gave them a few of the many reasons why they should vote to kill entirely the stamp curse of this bill. I have suggested and strongly recommended their substituting a tax of 2 or 3 per cent. on the net sales of all manufacturers of woven and knitted fabrics of cotton, wool, silk and linen goods, or mixtures of same. This would bring a large revenue, which would be indirectly paid by the consumers of goods made from these various fabrics. This tax would be easily collected and at a small expense. Such a tax would not be a burden. The consumer of these goods would not see, feel, taste or smell the tax. The unfortunate sufferers from catarrh and hay fever would need Klineck's Catarrh Remedy, the only cure for these afflictions, and yet would not be expected to pay \$1.04 for each bottle of this wonderful remedy. We sincerely hope you will succeed in recruiting an army of Dewey fighters to kill the entire tax by the use of stamps, and you will very greatly oblige,

Yours truly,

KLINCK MEDICINE CO.,

Per S. D. HASKELL, Treas.

HE WILL RAISE THE PRICE.

Buffalo, June 1st, 1898.

To the Editor:

Some days we had an inquiry from you as to the probable action which we should take in the event of the proposed war revenue bill passing, providing for the stamping of proprietary medicines. We were not at that time prepared to say just what action we should eventually take, but we want to say now that were the prices of our medicines as high priced to the trade as many other preparations, we should certainly not add the cost of stamps to our present list, but, as is well known to the trade, our dollar (\$1.00) articles have heretofore, and at present, sell to the retail trade at the uniform price of seven dollars and seventy-five cents (\$7.75) per dozen, while many of the dollar preparations are held at eight dollars and fifty cents (\$8.50), eight seventy-five (\$8.75) and nine dollars (\$9.00) per dozen.

Now we observe that one or two proprietors have sent out assurances to the trade that the cost of stamps will not be added to their prices, and that they will supply retailers with the necessary stamps to stamp any of their preparations which the dealer may have on hand when the proposed act takes effect. But we also observe that these proprietors are among those who are already getting eight dollars and seventy-five cents (\$8.75) and nine dollars (\$9.00) per dozen for their one dollar preparations, and there is good reason, therefore, why they are able to continue present prices without advancing in consideration of the stamp tax being imposed.

We wish to say further, that the new tariff rate and other causes, no doubt, have increased the price of many of the most important ingredients which enter into the composition of our preparations, which independent of any stamp tax had already increased their cost to such an extent as to lead us to seriously consider the matter of an advance in our prices. Therefore, it is altogether probable that we may find it absolutely necessary to make a general and substantial advance in the prices of all our preparations when it becomes necessary to stamp them. Just what that advance will be when it is made, it is impossible for us at present to state, but in view of the facts already mentioned it is probable that it will be for the full amount of stamps required and somewhat more.

Very respectfully yours,

WORLD'S DISPENSARY MEDICAL ASSO.

R. V. PIERCE, Pres't.

A JOBBER'S VIEWS.

The following letter of protest was sent to Senator McMillan by Jas. E. Davis, of Williams, Davis, Brooks & Hinchman Sons, Detroit, Mich.:

"Dear Sir—The stamp tax which is now before Congress is of vital importance to us as wholesale dealers and manufacturers, as well as of great interest to our customers, the retail dealers.

"We have made really no complaint regarding this tax outside of the single fact that we hope we will escape the stamping of stock on hand at the time the bill goes into effect, which we understand is likely to stand as we suggest.

"We, however, have been analyzing this stamp tax carefully, and we do not believe that the Senators and representatives really understand what an odious kind of class legislation this proprietary medicine tax and perfume tax is on a business which is now taxed 19 1/2 per cent. on the alcohol used, and permitting some of the largest corporations in the country, engaged in the same business, to escape absolutely free.

"For every dollar which a manufacturer pays in a proprietary medicine or perfume retails at is the proposed tax, but the manufacturer must put this stamp on, which makes it equal to 6 per cent. of the manufacturer's jobbing price, and other words, a manufacturer who sells \$100,000 worth of goods would have to pay a tax of \$6,000, which, in many cases, without doubt, is equal to his entire profit.

"Manufacturers must raise their jobbing rates, and the expense would largely fall on the small retail dealer.

"There are two classes of retail dealers at present in the country: one is called the cut-rate dealer, and the legitimate retail dealer.

"The cut-rate dealer, who sells a proprietary medicine that costs him 67 cents, for 75 cents, does not give himself a reasonable profit, but he must advance his price to 79 cents when the new stamp tax goes into effect. The legitimate retail druggist, however, who represents the 'corner drug store' throughout the country, and who represents 75 per cent. of firms doing business in a legitimate way, and who does not cut on retail prices, could not advance his price, and therefore this tax must come out of the retail dealer and not out of the consumer, as probably it is intended on the part of Congress.

"Now, take perfume, which is all alcohol, and which has already paid the Government an enormous tax of \$2.07 per gallon; this must also be taxed in the same proportion as proprietary medicines.

"It seems to us that we are going to tax any proprietary goods that we should not tax them all, and not single out the drug trade or allied interests to carry this burden.

"As near as we can decide in regard to the general effect of schedule B, it seems to us that it singles out our business individually, that if proprietary medicines are to be stamped, why should not all trade-marked and patented articles which are controlled be stamped, whether the article is a proprietary medicine or a baking powder; Quaker Oats or Sapolio, Cashmere Bouquet soap or Apollinaris water? Why should medicines alone bear this tax?

"We understand that there is in the neighborhood of 15,000,000 bottles of Apollinaris water sold annually. We use this article and other mineral waters. Is it not those who can easily afford to pay a tax?

"Take Cashmere Bouquet soap: it is a trade-marked article, has a large trade, is expensive, and only the better class of people can afford to use it, and we understand immense quantities are sold in the United States.

"Go a little further, and analyze carefully who are the people who buy patent or proprietary medicines. You will find largely that it is the poor people and middle classes of this country. The rich employ their physicians. The poor, who cannot afford physicians, depend upon the retail druggist for their bottle of patent medicine.

"We cannot but feel that this whole matter is a case of class legislation and is not thoroughly understood by our legislators in Washington.

"We cannot, for the life of us, see why our business should be singled out for an odious tax, be placed upon 50 per cent. of the articles that we sell, some of which are already heavily taxed with alcohol, when other trade-marked articles go scot free."

The City Council of De Kalb, Ill., has raised the saloon license to \$800, and henceforth drug stores which sell liquor will have to pay this amount into the city treasury for the privilege. Last year the drug store license was only \$1.

A young attorney of Canton, Ohio, died a few days ago, and the Coroner's verdict was that death was due to accidental opium poisoning. Testimony was presented to show that the man had taken large quantities of a cough medicine containing the poison. In this case there seems to be some ammunition for the Food and Dairy Commissioner of Ohio in his campaign against improperly labeled medicines.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bart, y. B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblenz, A.M., Ph. M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Wilber G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Phm. E., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Ph.D.	Henry H. Rusby, M. D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college; for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 27, 1898; the second term began February 17, 1898, and will end June 30, 1898. The junior class for 1897 is now closed.

FEES The entire expense is only \$7.75 per annum, and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 77.

Inorganic Chemistry.

The Platinum Metals.

Ruthenium. Osmium.	Rhodium. Iridium.	Palladium. Platinum.
-----------------------	----------------------	-------------------------

The above named six elements, on account of their similarity in properties and their occurrence together in the platinum ores, are commonly known collectively as the "platinum metals." They are characterized by their silver-white colors, rarity, high specific gravities, difficult fusibility and extreme resistance to the action of acids and other reagents. Platinum is at once both the most abundant and important member of the group, and the most deserving of extended consideration.

They occur mainly as grains or nuggets in river gravels and alluvial deposits, the grains usually consisting of from 60 to 85 per cent. of platinum, the other metals of the group constituting the remainder. Some of the grains are composed mainly of an alloy of platinum and iridium, known as "platiniridium," others of an alloy of iridium and osmium, known as "osmiridium."

As indicated by the arrangement given above, the elements of this group fall into two subdivisions, as indicated by their differences in specific gravity, which in the second group is nearly twice that of the first. In each group the specific gravity decreases, and the fusing point is lowered as the atomic weight rises.

	Ru.	Rh.	Pd.
Atomic Weight	103.5	104.1	106.2
Specific Gravity	12.36	12.1	11.4
Fusing Point	Nearly infusible. 2000° C. 1500° C.		

	Os.	Ir.	Pt.
Atomic Weight	191.	192.5	194.3
Specific Gravity	22.47	22.38	21.5
Fusing Point	Nearly or quite infusible. 1950° C. 1775° C.		

Some other of the important facts concerning these elements may be gained from the following table:

OCCURRENCE.	DISCOVERED BY	NAME DERIVED FROM
Ru ... { Platinum ores, iridosmine, etc.	Claus, in 1855	Ruthenia, Russia.
Rh ... " "	Wollaston, in 1804	Rhodon, a Rose.
Pd ... { Native with platinum.	" "	Pallas, one of the planets.
Os ... { Platinum ores and indosmium.	Tennant, in 1803....	Osme, odor.
Ir ... " "	" "	Iris, rainbow.
Pt ... { Native and with preceding metals.	Wood, in 1741.....	Plata, silver.

These elements differ considerably in their resistance to the action of reagents. Palladium is not affected by hydrochloric or sulfuric acid, but is readily dissolved by hot, concentrated nitric acid. Platinum and ruthenium are converted to their tetrachlorides by aqua regia and other liquids containing free chlorine, but are unaffected by ordinary acids. Osmium is converted to tetroxide by aqua regia, while iridium and rhodium are not affected by it.

Oxygen Compounds.—Each of these elements forms a monoxid, except iridium, the monoxid of which has not yet been prepared. Sesquioxides have been prepared of all but palladium and platinum. All form dioxides, ruthenium and osmium form tetroxides, and palladium forms a suboxid, Pd₂O.

Halogen Compounds.—All of these elements form tetrachlorides, except rhodium, the tetrachloride of which has not yet been prepared. Platinum and palladium also form dichlorides.

PLATINUM.

Historical.—Platinum seems to have been known as early as 1558 when a metal corresponding to it in properties was mentioned by the French philosopher, Scaliger. It was more particularly described by Ulloa, in 1748, and again in 1750 by William Watson, who obtained specimens brought to England by Charles Wood in 1841. The Spanish name given to the metal was "platina," from "plata," silver, on account of its white color and general resemblance to that metal.

Natural Occurrence.—Platinum occurs almost entirely in the native state, as described previously, and alloyed with other metals of the group in greater or less proportion.

Extraction.—The extraction of platinum consists mainly in purifying it from the metals with which it is associated, which is done by first dissolving the native metal in aqua regia, evaporating to dryness, and gently igniting, by which means the chlorides of palladium and rhodium are rendered insoluble in water. The ignited residue is lixiviated with water, and hydrochloric acid and ammonium chloride added to the solution, when the double chloride of platinum and ammonium, PtCl₄·2NH₄Cl, separates out as yellow crystals, the compounds of the remaining metals remaining in solution. The ammonio-

platinic chlorid, having been washed and dried, is ignited, when chlorin and ammonium chlorid are driven off, leaving the platinum as a black, spongy mass known as platinum sponge. The metal is then melted in a lime crucible with the oxyhydrogen flame and cast into ingots.

Description and Physical Properties.—Platinum is a white or grayish white metal, possesses a brilliant luster on polished surfaces, and is very malleable and ductile. It welds easily at a red heat. Its fusion requires the heat of the oxyhydrogen flame, and when melted in this way it absorbs large quantities of hydrogen which it gives up on solidification, producing the phenomenon of spitting, as in the expulsion of hydrogen from molten silver. Platinum has the curious property of condensing large quantities of oxygen upon its surface, so much so that it can act as an oxidizing agent of considerable power. A piece of platinum sponge held in a stream of hydrogen will cause the latter to ignite, or in a stream of alcohol or ether vapor will cause their oxidation, some times with such rapidity as to produce combustion.

Chemical Properties.—Platinum is not attacked by nitric, sulfuric, or hydrochloric acid. When alloyed with silver, zinc, or copper, it dissolves in nitric acid. It is dissolved by aqua regia, and by other liquids containing or yielding free chlorin. Platinum sponge and platinum black are slowly soluble in boiling solution of potassium cyanid, a double cyanid being formed, and hydrogen evolved. It combines readily with carbon, phosphorus, silicon, free bromin, and with caustic alkalies, or the alkali cyanids, or iodin, when heated in contact with these substances, and alloys readily with many metals. For this reason, substances containing or likely to yield any of the preceding substances should never be heated in or in contact with vessels made of platinum.

COMPOUNDS.

Oxygen Compounds.—Two oxids of platinum are known, the monoxid, PtO , and dioxid, PtO_2 . Both may be obtained by gentle ignition of the corresponding hydroxid. Like the oxids of the other noble metals, they are decomposed, by strong ignition, into free metal and oxygen.

Platinum hydroxid, $\text{Pt}(\text{OH})_2$, is precipitated as a black powder when platinum dichlorid is treated with potassium hydroxid. It dissolves in acids to form platinous salts.

Platinic hydroxid, $\text{Pt}(\text{OH})_4$, is thrown down as a yellow precipitate when boiling solution of potassium hydroxid is added to a solution of platinum tetrachlorid. It is capable of acting either as a base or acid, dissolving in the stronger acids to form platinic salts, or in the stronger bases, as potassium hydrate, to form platinate.

Halogen Compounds.—Platinous chlorid, or platinum dichlorid, PtCl_2 , can be prepared by the careful ignition of the tetrachlorid. It is a greenish powder, insoluble in water, but soluble in hydrochloric acid to a reddish solution containing chloro-platinic acid, H_2PtCl_4 .

Platinic chlorid, or platinum tetrachlorid, PtCl_4 , can be prepared by dissolving platinum in aqua regia, evaporating to dryness and gently igniting. When an aqueous solution is evaporated it is deposited in orange red crystals containing five molecules of water, $\text{PtCl}_4 \cdot 5\text{H}_2\text{O}$, and is not deliquescent. In solution with hydrochloric acid it forms chloro-platinic acid, H_2PtCl_6 , which on careful evaporation deposits reddish brown crystals having the formula, $\text{H}_2\text{PtCl}_6 \cdot \text{H}_2\text{O}$, and are deliquescent. This substance, commonly known as platinic chlorid, is chloro-platinic acid, and is used as a reagent for potassium compounds, with which it yields a yellow crystalline precipitate of potassium platinic chlorid, K_2PtCl_6 .

Sulfur Compounds.—Hydrogen sulfid with platinous solutions yields platinous sulfid, PtS , and with platinic solutions, platinic sulfid, PtS_2 . Both are amorphous, black powders, and are soluble in ammonium sulfid.

Ammoniacal and Cyanogen Compounds.—With ammonium compounds platinum forms no less than twelve series of combinations, resembling in their composition and general nature the corresponding compounds of ammonium and cobalt. With cyanogen it also enters into combination, forming double cyanids corresponding to platinic-cyanic acid, $\text{H}_2\text{Pt}(\text{CN})_4$.

Characteristic Reactions.—In the metallic state platinum is recognized by its tin-like color and luster, and by its resistance to ordinary reagents. Hydrogen sulfid precipitates

platinous sulfid from platinous solutions, and platinic sulfid from platinic solutions, both black and soluble in ammonium sulfid. From platinous compounds potassium iodid slowly precipitates red-brown or black platinous iodid, PtI_2 , and the black platinic iodid, PtI_4 , from platinic solutions. From solutions of platinic chlorid, ammonium or potassium chlorid precipitates yellow, crystalline ammonium or potassium chloroplatinate, $(\text{NH}_4)_2\text{PtCl}_6$, or K_2PtCl_6 .

ARGON AND HELIUM.

In addition to the elements already considered, several others are known with more or less certainty. The two most interesting substances of this kind are argon and helium, lately discovered, and still under process of investigation.

In 1785 the English chemist Cavendish, in his experiments upon atmospheric air, found a small residue amounting approximately to $\frac{1}{120}$ of the volume of the nitrogen present which he was unable to identify with any of the known constituents of air. The question thus raised seems to have remained practically unnoticed until 1894, when two other English chemists, Lord Rayleigh and Prof. Ramsay, in their experiments upon nitrogen found that this gas when obtained from the atmosphere was slightly but constantly heavier than when obtained from chemical compounds. After a laborious and painstaking investigation they were able to announce the presence of a new element in the atmosphere, to which they gave the name Argon, and which is doubtless the unidentified residue remarked by Cavendish more than a century before.

It constitutes about 0.8 per cent. of the atmosphere, and has been found occluded in meteoric iron, certain minerals, and in the waters of mineral springs. It may be obtained from the atmosphere by passing air over red hot copper to remove the oxygen, removing moisture and carbon dioxid by passing through caustic potash, and lastly by passing the residuum back and forth many times over heated magnesium. The latter absorbs the nitrogen to form a nitrid, leaving nearly pure argon behind.

The most remarkable characteristic of the gas is its inertness or inactivity with other elements, to which circumstance it owes its name.

Its density is 13.9, compared with hydrogen, which would give it a molecular weight of about 39.8. Whether its molecular weight is also its atomic weight depends upon whether its molecule consists of one or two atoms, and this as yet is undetermined. It is about $2\frac{1}{2}$ times as soluble in water as nitrogen, liquefies at a temperature of -121°C . under a pressure of 50.6 atmospheres, and solidifies at -180.6°C . Its spectrum consists of two red, one yellow, and five green lines.

Lockyer and Frankland some years ago discovered in the solar spectrum the spectrum of a substance which did not correspond to any known element, and which they attributed to the presence of a new element in the sun, and named it Helium. In 1895 Professor Ramsay, in experimenting upon the gases evolved from the mineral cleveite, discovered a gas previously unknown, and giving the same spectrum previously noticed by Lockyer and Frankland, and which he therefore named Helium. It is $2\frac{1}{8}$ to $2\frac{1}{2}$ times as heavy as hydrogen and, like argon, is remarkable for its inactivity. Its spectrum indicates the possibility of its being composed of two elements, but so far no separation of them has been made. It has not as yet been liquefied. (Prof. Dewar has, it is reported, just succeeded in liquefying both hydrogen and helium. Ed.)

A METHOD OF BLEACHING OLD IVORY consists in rubbing it with a flannel cloth saturated with oil of turpentine and then exposing the article to the direct rays of the sun. In a few days the yellow color disappears and gives the ivory a new appearance. This bleaching effect is due to the formation of ozone through the action of the sun on the oil of turpentine, the ozone being a powerful bleaching agent. (Südd. Ap. Ztg.)

LECTURE No. 78.

Pharmaceutical Processes.

Special Processes.

CORRECTION.—The lecture on "Pharmaceutical Processes" in the Era of May 26, page 752, was incorrectly numbered 72. It should read Lecture No. 74. Students will please note the correction.

As previously stated, Special Pharmaceutical Processes are those which affect or are concerned with the special or incidental properties of matter, as distinguished from those which affect its general or fundamental properties.

The special processes of pharmacy may produce either a change in the Form or State of Aggregation, or a change in the Relations or Combinations of the pharmaceutical materials to which they are applied.

PROCESSES INVOLVING A CHANGE OF FORM OR STATE OF AGGREGATION.

Natural or commercial substances may occur in masses of a size too great for the requirements of pharmacy or for their immediate use as medicine. In such cases certain processes of Comminution are necessary, whereby these larger masses may be broken up into fragments of suitable size, or reduced to powder. Again the substance may be in the solid condition, while the purposes for which it is intended may require it to be in the state of a liquid. This renders necessary certain processes of Liquefaction. Or the material may be in the liquid state when required in the form of a solid, which necessitates processes of Solidification.

These processes are mainly mechanical in their nature and are accomplished mainly by mechanical means, though in many cases chemical phenomena accompany the physical changes, and new chemical combinations may be formed.

PROCESSES OF COMMINUATION.

Comminution, from the Latin "comminuere," to reduce to particles, is a general term applied to any process whereby the state of aggregation of a solid is broken up and the body reduced to finer particles.

When the result of comminution is the production of a powder, the process is termed Pulverization. Pulverization therefore refers to the degree of comminution, and not to the particular operation employed to accomplish it.

The processes of comminution are nearly all mechanical, and will receive treatment in the following order: Cutting, Contusion or Bruising, Rasping, Grinding, Trituration.

Comminution by Cutting.—The most common application of this process is the slicing of roots into thin transverse sections preparatory to drying. Transverse cutting or slicing facilitates desiccation by permitting the ready escape of the watery portions of the juice through the severed ends of the hollow vessels which run lengthwise through the roots. It also aids in the subsequent further reduction of the drug by contusion or grinding, since in most vegetable drugs the woody portions occur in the form of long, stringy fibers which resist disintegration when reduction is attempted in a mortar or hand-mill, while if the drug is in the form of thin, transverse slices, the blows of the pestle or the grinding machinery strike upon the flat sides of the sections and quickly disintegrate them.

When only a small quantity of a drug is to be cut, a large sharp knife will answer. The knife chosen should have a long, broad blade, and a handle large enough to permit of a firm grasp, and which is without sharp corners, to avoid blistering the hand. A hatchet may also be used, provided the blade be broad and the edge sufficiently keen. For larger operations Roller Knives may be used. These consist of a convenient number of circular, wheel-like knives set upon a spindle, upon which they are free to turn, the spindle projecting sufficiently beyond the knives to serve as handles. The handles being grasped by the hands, the circular knives are moved back and forth

over the drugs like a rolling pin, quickly reducing them to fragments. Another convenient form of cutter is seen in the familiar rocker knives used by butchers to cut sausage meat, and used in the same manner by rocking the knives forth and back over the drug.

Cutting, whether by means of knives, hatchet or other instrument, is best conducted upon a heavy table or plank of soft wood, by which means the cutting edges of the instrument used are preserved from injury. The heavy chopping blocks of the butcher make excellent surfaces for this purpose.

Contusion.—Contusion is the process whereby a drug is reduced to fragments, or to a coarse powder, by repeated sharp blows. Crushing and bruising are similar processes and are frequently used as synonymous with contusion.

The drug to be crushed or contused is placed in a hollow container called a Mortar and the blows are delivered by a heavy instrument called a Pestle. (Fig. 36.)



Fig. 36.—Iron Mortars and Pestles, for Contusion.

The material of the mortar and pestle may be of iron, or other metal, of stoneware, or wood, but for obvious reasons mortars intended principally for contusion are best made of wood or metal. Green drugs, however, are better contused in mortars of hard wood, stoneware or other non-metallic substance, since the acid or other ingredients of the juice may react with the metal and receive injury.

Metallic mortars may be of brass, bell-metal, bronze, or cast iron, but the latter possesses all the necessary qualities of a metallic mortar, besides being the cheapest. The mortar should be heavy so as to afford a solid basis for the blow and to lessen the risk of fracture. The size and weight of the pestle should be adapted to the size and weight of the mortar, and the curvature of its striking end should be carefully adjusted to the curvature of the mortar's inner surface. Such an adaptation will not only save frequent cracked and broken mortars, but will materially lessen the labor of using them.

The inner surface of the mortar and the end of the pestle should be turned true and smooth and be kept polished and free from rust. Iron mortars, except those used for the most common purposes, should be tinned on the inside to lessen the danger of contamination of substances bruised or contused in them. Unless the surfaces of both mortar and pestle are kept clean and smooth, sufficient iron rust may be derived from them by astringent drugs to give to their preparations an inky appearance.

When large quantities of material are operated upon, continuous mortar practice becomes quite laborious, though the labor may be materially lightened by having the pestle of such a size that its own weight is sufficient to contuse the drug, and the handle of such a length that the mortar may be placed upon the floor while the operator stands erect before it. It is then necessary only to regularly lift the pestle and let it fall upon the drug.

Another method is as follows: To a hook in the ceiling fasten a couple of stout rubber bands to serve as a spring, and to the bands fasten a stout cord of such a length that when it is attached to the handle of the pestle the bottom of the latter will rest upon the bottom of the mortar when the bands are moderately stretched. If the bands are of the proper size and strength, and the cord of the right length, the elasticity of the rubber will be sufficient to lift the pestle after the down stroke, thus materially lightening the labor.

It is well to have a special place for the mortar which is used for contusion, such as a pillar or post which is connected with the foundation of the building, or with the earth, to lessen the noise as well as to avoid the injurious effect of the jarring upon delicate instruments, such as prescription balances, etc. Where it is not possible to have such a post it is convenient to have a coarse bag filled with sand, and which just fits into a keg or box of suitable height. The mortar being placed upon the bag, the sand takes up the jarring, while the bag prevents the sand from being scattered over the store.

When the substance which is being operated upon is poisonous or irritating, the escape of particles of dust may be prevented by covering the mouth of the mortar with a thick cloth in the middle of which is a hole through which the handle of the pestle is passed.

Rasping.—Rasping is the process of comminuting a substance by passing it forcibly back and forth, with pressure, over a hard, metallic surface studded with sharp points. Sometimes the substance to be rasped is held stationary and the rasp moved back and forth over it. In either case the points catch and tear off from the surface of the drug small fragments of the latter. The commonest example of the process of rasping is seen in the use of the nutmeg grater. The projecting points are made by punching holes in the tinued iron from which the grater is generally constructed. Rasping and grating both produce coarse powders only, and are now but little used in pharmacy, except where a small quantity of a powder may be wanted in a hurry. Filing, a modification of rasping, may be resorted to where a small quantity of a metallic substance is wanted in powder form.

Grinding.—Grinding is the process of comminuting drugs by causing them to pass between the revolving parts of a machine called a drug mill (Fig. 37), whereby they are

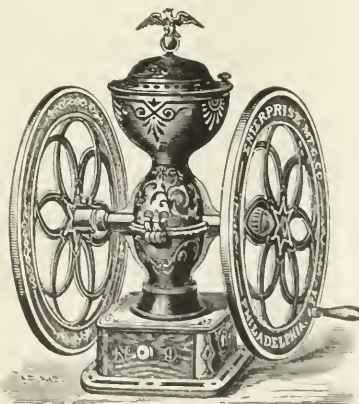


Fig. 37.—Enterprise Drug Mill.

reduced to powders of a greater or less degree of fineness. The disintegration caused by the drug mill is generally a combination of cutting, rasping, and crushing. It is the most thorough and effective of all the processes of comminution, and is the method almost universally used where large quantities of material are operated upon, and by manufacturers of powdered drugs.

The dispensing pharmacist usually purchases his supplies of powdered drugs from the professional drug miller, who conducts his business upon the large scale and is abundantly supplied with the apparatus for the reduction

of all kinds of materials, and is thus enabled to grind at a profit that which on a small scale would result in loss to the grinder.

The purchase of powdered drugs has much to commend it upon the score of economy and convenience, but opens a wide door for fraud which unscrupulous manufacturers are not slow to take advantage of. It should also be remembered that all drugs deteriorate more rapidly in the powdered state than when whole. To avoid the danger of adulteration and to insure the obtaining of fresh articles, powdered drugs should be purchased only in original packages, bearing the name of the grinder, so as to fix the responsibility if an inferior article be supplied; and, to insure the freshness of the drugs, they should be purchased only in such quantities as may be used within a reasonable space of time. For these reasons every pharmacist should be provided with a hand drug mill whereby small quantities of drugs may be reduced to powder, particularly those which are especially liable to be adulterated, or which quickly deteriorate when powdered, or which are rarely called for in the form of powder.

Of hand drug mills there are many styles and makes in the market, all of which are sufficiently described in the catalogues of their manufacturers, so that they do not merit an extended description at this place. Whatever make is purchased, to be fully serviceable, it should possess the following features:

Simplicity of Construction.—The more complicated the machinery, the greater the liability to breakdowns and imperfect work.

Ease of Operation.—This is generally secured through simplicity of construction. Moderately heavy and large balance wheels, and a careful and proper location of the crank handle likewise contribute to easy operation.

Durability.—The castings and other important parts of the machinery should be of sufficient size and strength to withstand any sudden strain that is liable to be put upon them.

Capability of Easy Regulation.—Some means should be provided by which the distance between the grinding surfaces may be quickly and easily adjusted, so as to modify at will the fineness of the powder produced.

Easy Accessibility of the Grinding Parts.—A mill which can not be quickly taken apart affords a continual temptation to a careless or busy assistant to permit the accumulation of material in the grinding parts, and a dirty drug mill is one of the surest marks of slovenly pharmacy.

Rules for Operating the Drug Mill.—The drug which is to be ground should be as dry as it is possible to make it without injury to its medicinal qualities. In general it may be stated that when the valuable constituents of the drug are volatile the comminution should be effected if possible without drying. Gums and gum resins may be best powdered in cold weather, the cold operating to make the drug brittle.

If the drug is in large masses it should be broken into pieces of small size before being thrown into the mill.

The drug should be added gradually and regularly. Too rapid feeding increases the liability of choking and stopping, and consequent loss of time. If added irregularly, the powder will vary in fineness.

The rate at which the mill may safely be run will vary with the nature of the drug which is being ground, but should never be at a speed great enough to heat the grinding parts. Under such circumstances drugs of a gummy or resinous nature, or which contain volatile constituents, are very liable to form compact masses which will clog the grinding surfaces.

Where a fine powder is to be produced it will be found advantageous to run the drug several times through the mill, each time reducing the distance between the grinding surfaces.

Never leave the drug mill to be cleaned until again wanted for use. Immediately after each grinding is concluded, the grinding parts should be exposed and all adhering substances picked or brushed off. If the drug was one having a marked odor the cleansing should be completed by running some inert substance, as chaff or meal, through the mill. The crumb of stale bread will be found an excellent article for this purpose.

Trituration.—Trituration as applied to comminution is the process of reducing a substance to powder by rubbing it against the sides of a mortar with a pestle. It is really a process of grinding, the surfaces of the mortar and the face of the pestle taking the place of the abrading surfaces of the drug mill.

Trituration is usually applicable only to chemical or crystalline substances, or those without a distinctly cellular structure. Drugs possessing the latter character are more easily comminuted by one of the processes previously considered, i. e., by contusion or grinding.

For the purposes of trituration the mortar and pestle may be either of glass, porcelain, marble, or of the well known as wedgewood. Glass and porcelain mortars, however, are easily scratched, while their smooth surfaces possess less abrading power than the other materials named.

The style of mortar best adapted to trituration is one which is broad and shallow rather than deep, and should be of a capacity sufficiently great to prevent the substance from being thrown over the sides during the operation. (Fig. 38.) The curve of the face of the pestle and



Fig. 38.—Mortar for Trituration.

of the inner surface of the mortar should correspond accurately with one another. The handle of the pestle should be large enough to afford a firm grasp to the hand without too great fatigue.

The process of trituration is best accomplished as follows: Grasping the pestle firmly, begin at the center of the mortar and trace a gradually enlarging spiral path until the upper edge of the powder is reached, then reverse the motion and cause the pestle to trace a gradually diminishing spiral until the center is reached again, and so on. This method will insure the production of a powder of uniform fineness in much less time than can be accomplished by an irregular rubbing in every direction.

Levigation and Porphyrization.—Sometimes trituration is performed on a slab of porphyry, or other hard material, with the aid of a flat-bottomed pestle known as a muller, when the process is specifically known as Levigation or Porphyrization.

This method is especially applicable to hard, crystalline substances which are desired in the form of impalpable powder. Like ordinary trituration the process is best carried out by tracing gradually enlarging and diminishing spirals on the plate, or by the tracing of a double circle, somewhat like the figure 8. It is frequently advantageous to add to the substance being ground sufficient water to make a paste.

SPECIAL METHODS OF COMMINUTION.

Pulverization by Intervention.—Some pharmaceutical substances, as camphor, wax, spermaceti, etc., are not readily pulverizable by the ordinary methods of comminution. If triturated directly in a mortar they would assume the state of paste, rather than that of a powder. This difficulty may usually be overcome by the use of a small quantity of some volatile solvent of the body, as alcohol or ether, just enough to reduce it to the condition of a very soft paste, which is then triturated continuously until the solvent has all evaporated, and the substance is left behind in the form of a fine, dry powder.

Comminution of Metals.—Gold and Silver may be powdered by rubbing the leaf or foil in a mortar or on a slab, with honey or syrup. When reduced to a sufficiently fine powder the soluble substance is washed out with water and the powder dried upon bibulous paper.

Zinc and similar easily fusible metals may be pulverized by melting and triturating the liquid mass in a mortar until it cools. At 205° C. zinc becomes very brittle and can be easily powdered in a mortar.

Other metals may be powdered by first reducing to a coarse powder by means of a file, and afterwards completing the process by levigation on a porphyry slab. Iron, copper and some other metals may also be reduced to powder by enclosing their oxides in a refractory tube of porcelain or iron and heated to redness while a stream of hydrogen is passed over them. The process in this case is a chemical one, the hydrogen combining with the oxygen to form water, leaving the metal behind in the form of a fine powder. The official Reduced Iron is an example of a powder made by this method.

Comminution by Precipitation.—Precipitation is also a method of comminution, especially of chemical substances, and may consist of either a chemical or physical process. In chemical precipitation substances are brought together in solution some of whose elements are capable of uniting to form an insoluble compound. In such case the insoluble compound will be formed and precipitated. The precipitated powder is then filtered out, washed and dried.

The preparation of the official yellow mercurous iodid is an example of this method.

An example of precipitation by physical means is afforded in the preparation of the official Precipitated Ferrous Sulfate. In this example the ferrous sulfate in aqueous solution is treated with alcohol in which the salt is insoluble and is therefore precipitated out. Other examples of the same kind may be seen in the preparation of the official resins.

Comminution by Granulation.—Another method of obtaining substances in the form of powder is by granulation. This method is in general applicable only to such substances as are crystallizable. The compound, generally a salt in solution or melted in its water of crystallization, is evaporated to dryness with constant stirring, when it will be found in the form of a dry, granular powder. The process is not applicable to such salts as contain water of crystallization, unless the latter is not desired in the finished product.

Comminution by Sublimation.—Sublimation may also be employed as a method of comminution, as seen in the preparation of flowers of sulfur. The sulfur is heated to boiling in a suitable retort, and the vapor is conducted into cold chambers where it is suddenly chilled, and falls to the floor in the form of a crystalline powder.

Other methods of comminution are occasionally made use of in pharmacy, but are better considered with the special processes in which they occur.

Degree of Comminution.—It is obviously necessary that there should be some method of indicating the degree of comminution or the fineness of powders. This is commonly indicated by the number of meshes to the linear inch of a sieve through which the powder will just pass. Thus a No. 20 powder is one which will just pass through a sieve having 20 meshes to the linear inch, a No. 40 powder through one having 40 meshes to the linear inch, and so on. Not more than a very small portion of the powder should pass through a sieve of greater fineness than the one designated.

The objection to this method of naming powders is that it does not take into consideration the diameter of the wire of which the sieve is made, the coarser the wire, the smaller the openings must be in order to obtain a given number of meshes within the inch. It would apparently be better therefore that the fineness of powders should be indicated by the size of the meshes in millimeters, or in fractions of a millimeter.

A druggist in Chester, Pa., suggests that each State shall build a war ship and present it to Uncle Sam. This would give us a navy, sure enough, and the suggestion is a very sensible one.

(Concluded from page 827, June 2.)

CINCHONA CULTIVATION AND ITS PIONEERS.*

Markham, Spruce, Pritchett, Cross, Ledger.

From the time that Dr. Royle, in 1839, had advocated the introduction of cinchona trees into India, the subject engaged the attention of the Indian Government, and in 1852 the Consuls in South America were instructed to obtain plants and seeds. One of these only carried out his instructions, and after disaster with his and other supplies, the project was left in abeyance, in spite of all Dr. Royle's efforts. In 1859, Sir Clements Markham, who knew the native country of the Cinchonas, and the language and customs of the people, had the undertaking introduced to his notice. He gained a Government commission for the task, and prepared for his work with the aid of Sir William Hooker, Mr. John Elliot Howard, Dr. Forbes Watson (the reporter on Indian products at the Indian Office), and Dr. Weddell. Sir Clements Markham conceived the idea of collecting the five descriptions named early in this article from their various homes, and dispatching supplies, by the aid of five agents, to this country. Of course, there was the usual Government delay and interference. First the authorities would grant nothing but a sailing vessel for transporting the plants, then a steamer was conceded when it was too late to make a counter order. Yet, at the time, a man of war was at Callao, and would easily have called at an Indian port on her way home. As a result of this bungling, four transshipments had to be made with the plants, and much injury to them risked. Sir Clements Markham took as one of his assistants, Dr. Spruce, the eminent botanist, who died a few years ago, and whose "researches into South American vegetation have been the most important since the days of Humboldt." He it was who did most to furnish us with knowledge of the *C. succirubra*. Mr. Pritchett was the assistant deputed to collect the Huanuco plants. In March, 1860, Sir Clements Markham started for the interior from Islay, and began those travels which he describes in entrancing style in his book. He commenced his real task in the forests of Caravayo, a province on the frontier of Bolivia and Peru. By May 11 he had collected a sufficient number of cinchona plants to fill the Wardian cases which they had left at Islay. On May 14 they had a collection of 529 plants—varieties of *Calisaya ovata* and *micrantha*. When he was ready to start back with his collection, disaster nearly overtook him, for the inhabitants had been roused to prevent him leaving the country with the plants. By June 1, however, the plants were safely deposited in the Wardian cases at the port of Islay.

Mr. Charles Ledger heard of Sir Clements Markham's expedition on his return to South America from Australia, but was unable to communicate with him. In 1861, however, he instructed his servant to collect seeds from the best kinds of cinchona. This man, after waiting for the trees to produce ripe fruit, collected seeds from that variety of the Bolivian *Calisaya* which the bark collectors considered best, and delivered them to Mr. Ledger in June, 1865. In making a second collection, his purpose was discovered, and he was so punished for it that he died. Half of these seeds were sold to the Dutch Government, and half to a planter on the Nilgiri Hills. As many as 20,000 of those sent to Java germinated, and a still greater number in India. From those in Java 7,000 plants survived, which in 1874 had multiplied to 40,000, and in 1875 10,977 plants had been planted out. Mr. John Elliot Howard named this variety of *C. Calisaya*, *Ledgeriana*.

Dr. Spruce, at the beginning of January, 1861, had managed to get aboard a steamer at Guayaquil 657 plants and 100,000 seeds, and Mr. Pritchett collected a supply of seeds from *C. nitida*, *C. micrantha* and *C. Peruviana*. Seeds of the varieties yielding "crown," Colombian and Carthagena barks were procured by Mr. Cross, a gardener, who accompanied the expedition. Hardly enough credit has been given to the work of this man, of the

value of which almost sufficient evidence is given by the mere statement that he made five expeditions into the interior of South America.

When the Calisaya plants arrived at Southampton, 207 were in a healthy condition, but they all died at Utacamund. Those yielding the "grey" bark were all dead on their arrival in India. Of the *succirubra* plants, however, 463 arrived in a healthy condition in India, and continued to thrive. All the seeds of these three germinated satisfactorily. The "soft" Colombian bark seeds and plants progressed, but the seeds of the "hard" did not germinate, though plants from them were successfully brought over and dispatched to India, and 50 plants were also obtained from root stumps of the kind yielding Carthagena bark.

McIvor, Anderson, King, Thwaites.

The Nilgiri Hills were selected for the establishment of the first plantations in India, and Mr. McIvor, who had been in charge of the Government gardens since 1848, had the care of putting the plants and seeds in their new locality. Utacamund is the chief English station in the Nilgiris, and lies at the foot of Dodabetta, the highest peak in the hills. The area of the Nilgiris is 268,404 acres. In 1861, McIvor was appointed superintendent of cinchona cultivation on the Nilgiri Hills. On April 7 of this year, 463 *C. succirubra* plants reached their destination in the Nilgiris in very good condition, and in May all had "taken fairly to the soil." The sowing of the seeds was not so successful at first, but a third and fourth trial produced much better results. In June, 1861, 2,114 cinchona plants of valuable species were at Utacamund, and in January, 1862, 9,732 plants. At the end of 1861 the exchange with Java already referred to took place, and about the same time, plants were sent to Calcutta in order to try operations in Sikkim. In 1862 Cross's seeds of *C. officinalis* germinated, and Mr. Howard presented a plant, variety *Urtusina*. By 1869 all the five kinds Sir Clements Markham had aimed for were established in the plantation. The *succirubra* and *officinalis* species soon showed a likelihood to be the pre-eminent kinds for India, though the plants yielding the "grey" bark also did well. In 1866 there were 244,871 trees planted out in the Nilgiri plantations. Cinchona cultivation was eagerly taken up by many private planters.

When the need for harvesting the bark became apparent, McIvor conceived his plan of renewing it. This consisted in removing the bark in longitudinal strips from the tree, which strips alternated with untouched lengths of bark, the tree being afterwards protected with moss. The renewed bark is richer in quinine, and forms itself the untouched strips when the next removal after six or twelve months' interval takes place, the renewed bark not being ready for about twenty-two months. Coppicing, another system of obtaining the bark, consists in cutting down the trees near to the ground, and allowing one or more of the crops of shoots, which rise from the stump, to grow. These are afterwards cut down and the bark removed, when shoots are again produced. McIvor believed wholly in mossing; Dr. King thought it might be best to combine the two. The bark, after removal, is dried by heat and stored.

After the plantation and propagation of the original species had become successful in India, there was forced on the notice of the authorities the question of hybridisation. This began to occupy attention in 1869. Seven years later Mr. McIvor died. Four years after his death, in 1880, the three plantations in the Nilgiri Hills contained 570,000 trees, of which all but about 3,000 were *succirubra* and *officinalis*. The extent of cultivation was 845 acres. The yield of bark was estimated to be eventually 391,666 pounds a year, valued at £80,000. The yearly expenditure was £5,000, and the total cost from the commencement of cultivation to 1880 was £160,000, including interest. The receipts up to then had been £173,046.

From 1880 affairs progressed all along. Sites for other plantations were chosen in the districts of Madras, Wainad, Coorg, and then a trial was made in a district far removed—Sikkim. Dr. Anderson, the superintendent of the Government gardens at Calcutta, was entrusted with this, and he conducted operations to 1870, when he died, and his work was soon afterwards continued by Dr. King. The plantation was formed near Darjeeling. It

* The British and Colonial Druggist in a recent issue presents an exhaustive history of Cinchona, which is here reprinted in its entirety as a most valuable contribution to pharmaceutical literature.

was in the Sikkim plantations that the real object of Markham's mission was first carried out, for here was commenced the manufacture of a cheap cinchona febrifuge for the natives.

Ceylon was the third field selected, and in February, 1861, operations were commenced here under Mr. Inwaite, the director of the Royal Botanical Gardens, near Kandy. Private enterprise apparently was begun early here, and extensively manifested, 25,524 plants being applied for up to 1864. Jamaica and Mexico were also tried, but although the former did send supplies to the London market once, we never hear of a parcel from either now.

Howard, De Vrij, the Hookers, Broughlon, Wood.

All the time this transformation of part of the earth's surface and diversion of a portion of its commerce were taking place through the labors abroad of explorers, agriculturists and botanists, there were chemists working in Europe towards the same end. When one reads of the position which John Eliot Howard occupied during this active period, one realizes with astonishment how vast an amount of accurate knowledge on the cinchonas he gained by observation and study. Him we picture, remaining at the center of civilization, receiving the results of these other men's labors, collating them, drawing inferences from them, checking for the guidance of each the conclusions of one with another, and becoming an authority to whom all appealed. Another side of his generous labor was that in which he performed examinations innumerable in order that the East Indian authorities might be directed to the cultivation of the best plants. By the assistance that he rendered India, there is little doubt that he did much to start the manufacture of a substitute for his own production.

De Vrij, as a chemist, did the same for Java. His work only recently was recognized by the presentation to him of the Hanbury medal. To-day he remains as one of the last of those early pioneers of the cinchona cultivation. The Hookers, Sir William and Sir Joseph, in a less intimate way, and as part of their general work in botanical science, rendered great help to investigators, and their names are honorably mentioned by several with gratitude.

This preliminary work led to the beginning of febrifuge manufacture in 1870 by Mr. John Broughton, a chemist who had been Frankland's assistant at the Royal Institution, and was in 1866 made quinologist to the Nilgiri Hills plantations. He called the febrifuge at first amorphous quinine. This was calculated to cost the Government one rupee per ounce. In 1870, 21½ pounds were made, and in 1872 and 1873 it had reached 345 pounds. But the Madras Government calculated—erroneously, according to Markham—that the manufacture was a loss, and through their intervention Mr. Broughton resigned, and after McVior's death the plantations were sadly mismanaged.

In Sikkim, however, things went more smoothly. In 1853, Mr. C. H. Wood, who had had charge of the laboratory and manufacturing department of a large firm of wholesale druggists, was appointed quinologist. In 1875 48 pounds of febrifuge had been made under his care, which increased to 7,007 pounds in 1879, and the cost of production was three rupees per pound.

Van Gorkhem and Moens.

Van Gorkhem, who succeeded Jungnhn in 1864, really commenced the modern era, and with it success, in the Java plantations. He had been trained as a chemist, and had devoted special attention for years to quinology. The great changes which took place under his rule were the cultivation of cinchona in the open instead of under the shade of forest trees, and the concentration of attention on the C. Ledgeriana from 1872, when its surprising value had been established. Van Gorkhem was greatly assisted by J. G. Bernolet Moens, who afterwards succeeded him as director. In 1880 the yield of the Government plantation in Java still exceeded that from the plantations of private growers, the latter yielding only about 50,000 pounds in 1879, whilst the former produced about 110,000 pounds the same year. Even in 1880, Ledger bark formed only a small fraction of that put up at auction in Amsterdam. From 1870 to 1880, the price fluctuated between the limits, 1.62 florins

per half-kilo (1s. 7d. per pound), and 2.55 florins per half kilo (4s. per pound).

Results 20 Years Ago.

We thus bring the history of cinchona down to the year 1880, a memorable date, twenty years after the first efforts to transport the plant to India had begun, and nearly twenty years previous to the present day. How did the world's bark trade stand then? The whole quantity of bark from South America in the London market from June, 1879, to June, 1880, was 6,961,360 pounds. In 1868 a small quantity of East Indian bark was sold for £2.815. In 1872 supplies began to come regularly, and in 1879-80, the Government Nilgiri plantations sent 207,400 pounds to London, the private plantations of the Nilgiris and Wainad 74,900 pounds, the Sikkim plantations 271,300 pounds and Ceylon 289,160 pounds, whilst Java sent 70,083 pounds to Amsterdam. Of course, much of the Indian bark was used for the quinetum; the total yield in India and Ceylon in 1879-80 was 1,172,060 pounds. The highest price ever paid for East Indian cinchona bark was 15s. 8d per pound, which was given for some officialis bark from the Nilgiri plantations.

The planter has obtained 14s. 1d. per pound for renewed "Crown" bark. Compare the prices in our market reports of the present day with these and then imagine yourself a bark cultivator! In 1880 the whole capital account which the Indian and Ceylon Government plantations had cost had been paid off with interest, and the plantations began to yield a clear annual profit. Since that time the Government has ceased to sell bark in the market, and the latest stage has been reached by its making arrangements for buying bark from private planters, in order to produce febrifuge. In South America, Bolivia alone set about an attempt to stem the tide. Messrs. Jenkin and Phillips, a firm of brokers respected by every wholesale druggist in London, some twenty years ago began to offer supplies of cultivated Bolivian quills, a practice they have continued and been pre-eminent in to the present day. In 1880 they obtained 14s. 6d. per pound for a parcel of this description. Would not they like to get it for their principals now?

Results To-Day.

Thus we bring events to the beginning of the modern period, when the days of official experimentation were succeeded by private enterprise, and cinchona cultivation became a thing of business. With this period, of course, the age of pioneers is ended; and as our object was to trace the steps in connection with personal endeavor, by which cinchona, from being a wild tree forming South American forests, became the material of wooded parks, as we may say, in India, Ceylon and Java, we can now bring this rapid survey to a close. A few last words on the state of things as they now are will, however, form an appropriate, indeed, almost a necessary close to this article. We will, as regards India, let the following observations of one of the oldest planters speak for themselves. They are to some extent recapitulatory, but they have interest apart from their relation to well-known facts, and the statistics he supplies are quite near enough to absolute accuracy for our present purpose.

India never did make very large plantations, probably 10,000 acres being the greatest extent of its area at any one time, but Ceylon went in largely for this cultivation, and the rapidity of its extension in cinchona estates has only been equalled by the rapidity of their disappearance from various causes. In 1867 there were only 50 acres of these trees; in 1872, 500 acres; in 1877, 5,000 acres; in 1882, 30,000 acres, and then cutting out and removal of the trees took place to such an extent that I should doubt if there are now 2,000 acres left. The rise and decline of exports of bark from Ceylon has followed much the same course. In 1877 there were only 72,000 pounds exported; in 1882, 4,000,000 pounds were shipped; and in 1887 the exports reached nearly 16,000,000 pounds, after which a steady and rapid decline took place, so that in 1892 the exports were under 7,000,000 pounds, and in 1897 Ceylon only supplied us with 600,000 pounds of cinchona bark.

India has never supplied more than 3,000,000 pounds, and last year (1897) under 1,000,000, but the produce of the Government plantations has been worked up locally into a febrifuge and sold at a very cheap rate, after the natives themselves. India will not be large at any time. Small stocks of barks no doubt exist on some estates, and there has not been such a complete removal of trees as in Ceylon, but still supplies from South America, Ceylon and India may therefore be put on one side, so far as their exports would affect the bark supplies of the world; but Java is the place which produces five-sixths of the material from which quinine is now made;

and the question is, what can it do? The extension of plantations has been very gradual and scientific, only the best varieties of cinchona being put out, with the result that the average percentage of quinine in Java bark is 5 per cent., against only 2½ per cent. in the produce of India and Ceylon. The supplies from Java have risen steadily from about 700,000 pounds in 1882 to 4,000,000 pounds in 1887, which quantity was doubled in 1892, and 9,000,000 pounds were sent to Europe last year.

During 1897, 152,000 seedlings were planted in the Government plantations of Java. The total number of trees at the end of the year was about 2,750,000, of which 1,720,000 were *Ledgeriana*, 4,500,000 *succubra*, 470,000 hybrids of these, and 58,000 officialis. The Government plantations are now only a small fraction of the whole, and are being reduced again to experimental size.

Apart from Java, India and Ceylon, the only country which has shown any success worth mentioning in the cultivation of cinchona is Portuguese West Africa. This as a source of supplies was not even mentioned by authorities twenty years ago. Books which enumerated Algeria, Reunion, Guadeloupe, Jamaica, Brazil, Mexico, United States and Australia as places where the plant was being cultivated, said nothing of a source which in 1897 sent over twice as many packages of bark to London as the whole of South America. As regards South America, supplies have dwindled and dwindled, until last year only 1,500 packages were sent to London from the whole of that original home of the cinchonas.

(Special Correspondence.)

FRENCH PHARMACEUTICAL AFFAIRS.

Paris, May 20, 1898.

A Chapter of Accidents.

A serious explosion took place in the basement of Genasi's pharmacy, Flers, (Normandy) on the 6th inst. The shopfront, shelves and floor were destroyed, some of the wreckage being found 25 yards away. Several persons who were in the pharmacy were injured, one of them severely. The fire which followed the explosion lasted from 8 to 11:30 p. m., the house being entirely destroyed; a fact which considerably increased the difficulty of tracing the cause of the accident.

M. Hubert, chemist at Béziers, was adding sulphuric acid to permanganate of potash to produce ozone, when the receptacle containing the mixture exploded. M. Hubert's hand and part of his face were almost entirely blown away, and one eye injured; he lies in a critical state.

The Gravioux cliff, overhanging the little town of Domme (Dordogne), is about 100 feet high. Madame Camus was gathering medicinal plants on its brink when the soil crumbled under her feet, and the old lady (she was 80 years of age) was picked up dead and horribly mutilated.

A case in which an overdose of a mixture containing ammonia was administered to a sick child by the error of a pharmacy assistant is attracting some attention in Paris, and the matter is being thoroughly sifted, with a view to fixing the responsibility and the exact facts. In this case the pharmacist does not appear to have insured himself against accidents in dispensing, as is often done here, and one pecuniary penalty, if inflicted, will consequently fall directly on his shoulders.

M. Cappez, vice-president of the Parisian Pharmacists' Syndicate, told a "tale with a moral" to his colleagues at their annual meeting last month. A herbalist, (unlicensed of course, to sell such medicaments) prescribed and supplied laudanum to one of her female friends for an earache. The pain over, the friend left the half empty vial on a table; and her husband, of drunken habits, entered, during her absence, and emptied it at a draught. The wife ran to the herbalist, the latter, fearing prosecution if the facts were disclosed, could only wring her hands and insist on the fact of her having sold poison being concealed. But M. Cappez thinks she will not be in a hurry to "practice pharmacy" again.

Annual Pharmaceutical Gathering.

A pleasant little ceremony, characteristically French, marked the annual meeting above referred to. M. Labelonye has been treasurer of the Paris Syndicate for 28 years, and has just been named an "officer of academy," an honorary title conferred by the French government on those who do good work in educational lines.

M. Pellisse, chairman, after comparing M. Labelonye's modesty and virtues to those of the violet which was to adorn his buttonhole (the academy decoration is violet) embraced him "in the name of all his colleagues," and on their behalf, offered him the little ornament (which is the outward and visible sign of his new dignity), set in diamonds. The veteran treasurer suitably expressed his gratitude and emotion.

The General Association

of French pharmacists held its annual meeting on April 14th at the Paris School of Pharmacy. Except the elections, there was little of interest on the notice paper, but the voting was exciting and decisive.



M. PETIT.



M. RIETHÉ.

M. Petit, who has presided over this great body of French pharmacists for the last 15 years, was outvoted, the successful candidate for the chairmanship being M. Riethé, a comparatively young but very active and popular member of the Parisian Pharmacists' Syndicate, who edits a bright little monthly bulletin on pharmacy matters. He was president of the Syndicate a year or two ago; is a neat and persuasive speaker, and a general favorite. He was somewhat reluctant to take M. Petit's place, but the large majority in his favor induced him to accept.

It was generally felt that M. Petit's long and numerous services to the association ought to be recognized, and the meeting unanimously voted him (1) the title of Honorary President, (2) the chairmanship of the International

Pharmacy Congress of 1900.

It will be remembered that it was M. Petit who, at the close of the Brussels Pharmacy Congress, invited the members to Paris for 1900.

President Félix Faure is to open the Medical Congress in 1900; about 5,000 doctors are expected. The Pharmacy Congress can perhaps hardly hope for such favor or such numbers. The Academy of Medicine (the "Pharmacy Section" of which includes several leading Paris pharmacists) is preparing plans for a new \$200,000 building to replace their present picturesque but highly unsuitable and inadequate home. This building is to be completed for 1900, of course, to receive their foreign guests.

The University of Paris

is about to raise a loan of \$340,000; (1) for the construction of laboratories of Chemistry and Physics in the rue Cuvier, (2) for the completion of the laboratory of Vegetable Biology at Fontainebleau. It should be noted that the various French universities, since the law of 1807 was passed, now form corporate bodies controlling their own finances, etc. The same act gave them the right to confer scientific degrees, i. e., diplomas which do not confer the right to practice the professions in France. The Paris University has just decided to create a diploma of

Doctor in Pharmacy.

French candidates must already possess a "first-class" pharmacists' diploma; foreigners will be allowed to enter on producing two certificates (one for studies in toxicology and chemical pharmacy, the other for galenicals and materia medica) of competency. A year's study at the Paris School of Pharmacy is likewise exacted before entering for examination.

Chemical Names as Trade-Marks.

M. Petit still continues his crusade against this abuse. The Appeal Court decided, three months ago, that the words "Chloralose" and "Glucio-chloral," were not the

exclusive property of Messrs. Bain and Fournier. It would appear that these two latter chemists had aided Drs. Henriot and Richet in their scientific experiments, and had registered the word "Chloralose" as a trade-mark on 27th Dec., 1892. It was only on 9th Jan., 1893, that Drs. Henriot and Richet described the therapeutic properties of this combination of chloral and glucose at the meeting of the Academy of Sciences. The judgment stated that this fact of the registration of trade-mark a fortnight in advance "did not give the exclusive right to sell the remedy under the name by which it was introduced to the scientific world, which had remained the generic name of a class of products," that the ownership of the name was equivalent to the ownership of the article, and that "to give them the sole right to the title chloralose would be to give them, for the advertisement and sale of the article, a monopoly which the law does not permit."

In the same way Messrs. Durand and Huguenin claimed the ownership of the word "Salol" and seized samples of M. Petit's packages ticketed "Salicylate de Phenol, synonyme Salol." The Fourth Chamber of the Court of Paris gave judgment on March 10th last. "That the word Salol is used everywhere to describe Dr. Nencky's product; that this denomination was usual, and had long become public property when, in 1893, Durand and Huguenin took the word for their trade-mark" that Salol had, in fact, become the common name for the product in question, and that M. Petit had the right to use it in the way he had done.

At the "Salon" of 1898

scientific pictures are conspicuous by their absence. There are a series of panels for the Natural History Museum representing Primeval Man,—an idea probably copied from Besnard's frescos at the School of Pharmacy—a large composition of "Industry receiving the discoveries of Art and Science," a curious but somewhat repulsive scene in a Parisian abattoir, where the "Drinkers of Blood," feeble and anæmic persons, swallow the glass of steaming crimson fluid handed them by the wooden-shod butcher, who has just felled and cut the throat of the ox which lies at his feet. In the "Paris Municipal Council" one recognizes fair-bearded, youthful looking Dr. Navarre, the President, as the central figure. Not far off is the Vice-President, M. Astier, proprietor of the "American Legation" pharmacy in the Avenue Kleber, close to the Arc de Triomphe. Ruddy, and of a cheerful countenance, with a sleek black beard, he looks nevertheless like a vigorous and active man who is likely to come to the front in politics. At the back the bushy head of Councillor Berthelot (son of the famous chemist and Senator) is bent over his desk.

The Liquefaction of Hydrogen and Helium.

by Prof. Dewar's process, was described by M. Moissan at the Academy of Sciences last week.

Lockjaw Cured.

The cure of tetanus by inoculation of antitoxic serum on the brain, described by M.M. Roux and Borrel at the Madrid Hygiene Congress, has been successfully carried out on the human subject in Paris,—in one instance at least.

New Applications for X-Rays

were described by M. M. Remond and Née to the Academy of Sciences. By means of a static unipolar machine, (the pole being on the ground) and a Crookes' tube (also unipolar) enclosed in a metal case of suitable form, the X rays can be introduced into the various cavities of the human frame, which thus becomes transparent, so to speak. The dentist adopts a case fitting the mouth, the accoucheur a form which allows of the illumination of the female sacrum, etc., and a special tube is being blown (it is stated), to drop down the gullet into the stomach and examine for tuberculous or other ailments.

Dead, but Not Forgotten.

A bust of Schutzenberger was inaugurated last month at the School of Applied Chemistry and Physics of which he was the founder and director.

M. Aimé Girard, member of the Academy of Sciences, professor of applied chemistry at the Arts and Métiers School, etc., died last month. He wrote a Dictionary of Applied Chemistry, works on dyeing, etc.

Dr. Davaine, a young Parisian practitioner, practised

insufflation on a child suffering from croup and fell a victim to his devotion. Various journals, commenting on the case, remark on the identity of his name with that of a member of the Academy of Medicine who died in 1882, and who seems to have been to some extent a precursor of the Pasteurian doctrines.

SCIENTIFIC NOTES FROM SCHIMMEL'S ANNUAL REPORT.

ANGOSTURA-BARK OIL has recently been investigated by Messrs. H. Bekurts and J. Troeger. The oil obtained from the bark of *Cusparia trifoliata* Engler (*Gallipea officinalis* Hancock), yielding 1.5 per cent of oil, has a light-yellow color when fresh, darkening in time and finally acquiring a brown color. Its specific gravity is 0.941 at 20°. No phenoles, ketones, aldehydes and acids could be found in the raw oil. Some preliminary tests confirmed the observation of the elimination of water when the oil is submitted to fractional distillation; therefore only one distillation under atmospheric pressure was resorted to. The main part of the distillate passed over at 260° to 280°. A small part passing over at less than 200° boils at 160° and has a pinene-like odor. From this fact the investigators infer the presence of this hydrocarbon. The fraction passing over at 260° to 280° consists of a mixture of a sesquiterpene and a compound of an alcoholic nature. A separation of these two constituents offers considerable difficulty, inasmuch as the alcoholic one, called galipenic alcohol by the investigators, boils at 264° to 265°, while the sesquiterpene passes over at 258° to 260°. The alcohol has as yet not been characterized by special qualities; the only determination made consists in ascertaining the fact that it is converted into a dextrogyrate sesquiterpene by heating it with acetic anhydride in a closed tube to 170°. This sesquiterpene forms a yellowish oil, having a specific gravity of 0.9110. When glacial acetic acid-hydrochloride is used in place of acetic anhydride, a hydrochloric addition-product results, melting at 114° to 115°; and when glacial acetic acid-hydrobromide is used, a hydro-bromide is formed, melting at 123°. When dehydration is effected by phosphoric anhydride, a slightly levogyrate (—10°) sesquiterpene results. A stronger levogyrate hydrocarbon is obtained by heating the hydrobromide, melting at 123°, with aniline. On account of the minute amount of sesquiterpene obtained, the investigators were unable to determine the properties of the pure sesquiterpene, which seems to be identical with cadinene. Efforts to obtain galipenic alcohol by acetylizing the sesquiterpene by means of a mixture of glacial acetic and sulfuric acids and thereby to establish the relation of both compounds to each other, have thus far failed.

ANISE OIL IN RUSSIA.—The recently published work "The Productive Factors of Russia," compiled by W. J. Kowalski, Director of the Department of trades and manufacturing industries, contains the following statement in regard to the production of anise in Russia: "Anise is cultivated mainly by farmers, to a considerable extent in the districts of Walcysk, Birjutschensk and Ostrog. They are the principal seats of its culture. It is furthermore cultivated, although to a less extent, in the governments of Podolia, Kursk, Charkow, Tauria and Cherson. Part of the annual production is used for the distillation of anise oil at the places of cultivation, the balance for domestic applications and for exportation. The annual export during the last 10 years amounted on the average to 150,032 puds, worth 453,721 rubles per annum. The commercial centres of the anise trade are the cities of Krassnaja and Alexejewskaja in the government of Woronesh. The production of anise oil in Russia in the year 1893 amounted in the value to 105,500 rubels."

CEDAR LEAF OIL.—Considerable confusion prevails in American markets in regard to this oil in consequence of the fact that several different conifers pass under the common name "cedar," the principal ones being *Juniperus virginiana* (Red cedar), *Thuja occidentalis* and *Chamaecyparis sphaeroides* (both White cedars). Although in common usage a distinction between these so-called cedars is made, the distillers of cedar oil seem to ignore

or not to be aware of, such differences, using the needles indiscriminately for distillation. We succeeded in obtaining a large sample of needles from one distiller, which seemed to consist of *thuja* leaves only, but the oil obtained from the specimen was not pure *thuja* oil. It is therefore no wonder that a considerable variation is constantly observed in the commercial oil of cedar leaves. In August 1894 we distilled some cedar leaf oil from the needles of *Juniperus virginiana*, collected fresh under our control, and noticed the difference of this oil from all the commercial oils. We have recently submitted this oil to an examination. Its sp. gr. is 0.887, its opt. rot. +59° 25' and it is insoluble in 16 parts of 80 per cent. alcohol. Its odor is pleasant, somewhat sweet. On fractionation, most of the oil passed over at 180°, and of this the greater part between 173° to 176°. The specific gravity of this fraction was 0.847, its optical rotation +89° (at 20°). When acted upon by bromine, a tetrabromide was readily obtained, melting at 104° to 105°, showing that this fraction consists of almost pure dextrogyrate limonene. Constituents of a lower boiling point were present in minute quantities suggestive of pinene. They yielded a nitrosochloride but no crystalline piperidine and benzylamine compounds. The phellandrene test also failed. The fractions having a higher boiling point than limonene were treated with alcoholic potassa solution, as they contained small amounts of saponifiable constituents (saponification number of the original oil 10.9, acetylation number 39.1). The acids eliminated by this process rendered a silver salt suggestive of valericianic acid. The oil freed from acid rendered, when submitted to fractional distillation in vacuo and subsequently under ordinary pressure, a distillate passing over at 210° to 215°, which solidified on cooling and yielded borneol, melting at 203° to 204°, when expressed and sublimated. The part having the highest boiling point contains cadinene, readily indicated by its characteristic hydrochloride. Accordingly, true cedar leaf oil consists mainly of limonene, cadinene, some borneol and small portions of bornyl esters. True oil of cedar seems not to come into commerce; the common oil passing under this name is an indefinite distillate of miscellaneous conifer needles including those of *thuja*. Red *thuja* oil, sometimes met with as "cedar oil," should more properly pass under the name of *thuja* oil.

GERANIOL.—According to recent researches by Messrs. Wallach and Naschold, geraniol is completely resolved into hydrocarbons when heated with water in an autoclave for some time to 250°, the principal one being dipentene. In our experience this decomposition takes place already at 200°, although incompletely, leaving a considerable part of geraniol undecomposed, but separating an alcohol different from geraniol. This alcohol has the same odor and physical properties as linalool. We used for these experiments pure geraniol, regenerated from its calcium chloride compound. The carefully fractionated product of the reaction yielded one portion boiling between 100° and 103° under a pressure of 20 Mm., and possessing the characteristic odor of linalool. At the ordinary atmospheric pressure (479 Mm.) this fraction passed over like linalool, between 197° and 199°; the spec. grav. of 0.874 at 15° also corresponds to that of linalool. The only difference seems to consist in its optical inactivity, as is also the case with geraniol. The refraction is 1.46583 at 19°. In order to more completely deprive this substance of terpenes and, at the same time, to prove its alcoholic nature, it was converted into the sodium salt of the acid phtalate acid ester; the aqueous solution of this was agitated with ether. From this ether solution the ester salt could be separated by the addition of sodium chloride. When treated with alcoholic potassa solution, the remaining alcohol had the odor and the physical properties of linalool. On distillation, it passed over between 198° and 208° under 733 Mm. pressure, and at 80° to 81° under 10 Mm. pressure. Its spec. gr. is 0.877 at 15°.

GUAIACUM WOOD OIL.—The wood ("Palo balsamo") producing this oil is said to be derived from *Bulnesia Sarmienti* Lorentz. A description of this plant, belonging to the family Zygophyllaceae and growing wild in Argentina, was published by Grisebach in 1879. It is a slender tree, 40 to 60 feet in height, having a dense, heavy resinous wood, and named by the aborigines "palo santo" (holy

wood). This name (*lignum sanctum*) is also used for the wood of *Guaiacum officinale* and *Guaiacum sanctum*, and also for that of *Portleria hygrometrica* Ruiz and Pavon, derived from a tree belonging to the family Zygophyllaceae and growing in Chili. The name seems also to be applied to the wood of *Casalsipinia melanocarpa* Gr. of Argentina, called there *Guaiacum* or *Quebracho*. Until further more decisive evidence is obtained, the derivation of this wood from *Bulnesia Sarmienti* seems to be still undecided. It has never been offered to us under any other name than that of *Palo balsamo* or *pokewood*. Nor is there any mention made in the notes of the characteristic balsamic odor of the wood.

LINALOE OIL.—Prof. J. Müller in Graz has published an additional paper on the source of linaloe wood. In a former paper he expressed the opinion that the false aloe wood probably was not derived from an *Amrylis* species, but from a *Bursaceae*. In his recent paper he claims that aloe wood and linaloe wood have nothing in common but the name. Linaloe wood comes into commerce in two different kinds, the one from Mexico, the other from French Guyana. The Mexican wood is the source of the true linaloe oil, distilled therefrom both in Mexico and in Europe. It is derived from various species of *Bursera*, particularly from *Bursera Delpechiana* Poisson and *Bursera Aloëxylon* Engl. Linaloe wood from Cayenne, yielding an oil similar to that from Mexican wood, is not derived from a *Bursaceae* but from a *Lauraceae*, probably *Ocotea caudata* Mez. The wood is identical with "licari" or "bols de rose femelle." The Mexican wood does not contain the oil in special cellular tissues, but it is distributed through the circular strata of the parenchyma and proscenchyma of the wood, while the Cayenne wood contains the oil in enlarged parenchyma passages. It contains much less essential oil than Mexican wood, a fact long observed by distillers.

OIL OF ROSE.—The long prevailing uncertainty in regard to the principal constituents of the fluid part of oil of rose has finally been settled. It is now generally agreed to consist of the two alcohols $C_{10}H_{18}O$ and $C_{11}H_{20}O$, the former constituting 75 per cent. of the oil. It has been settled that this alcohol ($C_{10}H_{18}O$) is identical with the geraniol obtained from palmarosa oil by Jacobsen in 1870, while the alcohol $C_{11}H_{20}O$ corresponds to that obtained by Dodge in 1890 by the reduction of citronellal and called by him citronellol. In spite of these settled facts the so-called rose oil problem still remains in dispute, inasmuch as a controversy in regard to the proper names of these alcohols is still going on. Most chemists prefer to retain for the alcohol $C_{10}H_{18}O$ the name of geraniol in recognition of the priority of the discovery by Jacobsen, while Barbier and Bouveault call it lemonol, and Erdmann and Huth, recently joined by Poleck, rhodinol. Similar differences prevail in regard to a name for the alcohol $C_{11}H_{20}O$. Tlemann and Schmidt, who have shown its identity with Dodge's citronellol, have properly retained this name but deem it pertinent to also retain for the levogyre modification of the alcohol contained in oil of rose the name rhodinol chosen by Eckart for the mixture of geraniol and citronellol which he at first believed to consist of a definite alcohol different from geraniol. Messrs. Barbier and Bouveault also call the alcohol $C_{11}H_{20}O$ rhodinol and Messrs. Ilse and Naschold call it *rénionol* (on account of its presence in *Rénion*) oil of geranium. Our opinion in this matter remains unaltered. Geraniol has been known since 1870; its properties have been correctly ascertained by its discoverer, Prof. Jacobsen and it is but proper and right to retain the name chosen by him for the alcohol $C_{10}H_{18}O$ found in oil of roses and identical with geraniol. Similar are the conditions in the case of the alcohol $C_{11}H_{20}O$. Dodge's priority being unquestioned. The name citronellol the more deserves the preference, as it takes account of the relations of the alcohol to the earlier known compounds of citronellal and citronellilic acid. The various intricate methods of the examination of rose oil have recently been increased by some additional suggestions, proposing in the detection of a supposed admixture of palmarosa oil to ascertain the figure of acidity and of saponification and to apply Mauméné's test. (Elevation of temperature of the rose

oil diluted with fluid paraffin when mixed with concentrated sulphuric acid).

SWEET GUM OIL.—The leaves of Liquidambar styraciflua L., or sweet-gum tree, have, when bruised, a peculiar turpentine-like odor. When distilled they yielded only 0.655 per cent. of oil, having a greenish-yellow color, a spec. grav. of 0.872, the opt. rot. —38° 45', the saponification number 0.9 and the acetylation number 25.2. The oil contains, besides terpene, borneol and bornyl acetate; the odor recalls that of the oil of *Abies pectinata* D. C.

SODIUM PHOSPHATE SOLUTION.*

BY JOSEPH W. ENGLAND.

The limited solubility of the official "crystallized" sodium phosphate—about 10 grains to the fluidram of water, at ordinary temperature—and the much less solubility of the "dried and powdered" salt of commerce—often used—which is the crystalline salt minus its 60.3 per cent. of water of crystallization, has militated somewhat against the more extended employment of the compound, although its use has rapidly grown in recent years. The so-called "granular" form is more convenient to handle than the crystalline, but it contains almost as large a percentage of water, and, as efflorescence of salt readily takes place on exposure to air, water is lost, and the percentage of active ingredient becomes indefinite.

The advantage in using the dried and powdered salt rests in the fact that it contains only about 1 per cent. of water, and loss of water, if any, is within very narrow limits.

Various formulas have been proposed for making solutions of sodium phosphate. The one most generally employed is that of a "solution of citro-phosphate of sodium," originated by William C. Westcott, as a result of his analysis of a widely-advertised proprietary preparation, claimed by the manufacturers to contain, in each fluidram, 85 grains of combined sodium phosphate, citric acid, and sodium nitrate.

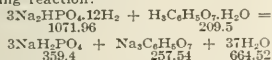
Westcott's formula is as follows:

Sodium phosphate crystals... 7 ounces (Troy) 290 grains.
Citric acid..... 475 grains.
Sodium nitrate..... 73 grains.
Water, a sufficient quantity
to make..... 8 fl. ounces.

Triturate the salts and acid until they liquefy, and add the water.

Now, it will be noticed that, in this formula, the proportion of citric acid used to anhydrous phosphate is very large, relatively, i. e., about one-third. Three thousand six hundred and fifty grains of crystalline salt would yield 1,449 grains of anhydrous salt, and for this 475 grains of citric acid is directed.

The question that naturally arises at this point is, "What chemical change ensues in the making of this preparation?" In the writer's opinion, part of the official sodium phosphate, or acid phosphate, is changed into sodium diacid phosphate and sodium citrate, according to the following reaction:



If this theory be correct, it will be seen that a part of the sodium phosphate is changed to sodium citrate. Assuming that the reaction given is correct, it will be found by equation that, in the 8 fluidounces of solution, 475 grains of citric acid are changed to 584 grains of sodium citrate, or about 9 grains of the latter to each fluidram.

The question that we, as pharmacists, should like to ask of you, as physicians, is this, "Whether or not the presence of sodium citrate and of sodium nitrate is ever contraindicated, therapeutically, when the use of sodium phosphate is indicated?" If they are, then a formula should be devised whereby this objection shall be eliminated.

For more than a year past the writer has used in the Philadelphia Hospital a formula which he thinks overcomes such an objection, if it exists. The following is the formula used, slightly increased in proportion of ingredients over original formula:

Sodium phosphate, dried and powdered, 3 ounces (Troy) 96 grains.
Acid phosphoric (50 per cent.), 1½ fluid ounces (921 grains).
Water, a sufficient quantity to make 8 fluid ounces.

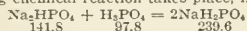
Dissolve the solids in the water, which has had the acid previously added to it, and filter through paper.

Especial care should be taken to use the nearly anhydrous "dried and powdered" sodium phosphate, and not the "granular" salt with its 57 per cent. of water, or the resulting preparation will be excessively, and possibly dangerously, acid. If desired, the 85 per cent. acid of the U. S. P., '90, may be used in place of the 50 per cent. acid, employing a proportionately less quantity (i. e., 542 grains). The 55 per cent. acid should be always weighed, however, and not measured, in order to ensure greater accuracy. Its great density increases possibility of error in measuring, unless checked by weighing.

The dose of this preparation of sodium phosphate is one to two teaspoonfuls in a wineglassful or more of water, preferably hot, three times a day, one hour before eating. If taken cold it may be made very acceptable by the addition of about ten grains of sodium bicarbonate (baking soda), when effervescence of carbonic acid gas ensues, and a grateful vichy-like solution results. If the volume of the dose be objected to, a teaspoonful or more of the solution diluted with an equal volume of water may be given, followed by the wineglassful or more of water. But on therapeutic grounds, a relatively larger volume of water should always be given coincidentally with the dose.

As thus made, the solution of sodium phosphate is a clear, transparent, faintly acid liquid, slightly heavier than official syrup, having a cooling saline taste, mixing with water unchanged in all proportions, remaining liquid at ordinary temperature, and yielding to each fluidram, on evaporation to thorough dryness, about thirty grains of anhydrous salts.

In the making of the solution, the writer believes that the following chemical reaction takes place, in part:



In other words, the official sodium acid phosphate becomes partially sodium diacid phosphate—just as occurs, probably, in following Westcott's formula—while the larger proportion remains the official sodium acid phosphate, but with the difference that no sodium nitrate or citrate is present, or is formed.

Clinical results have shown that no difference in effectiveness results from the presence of the diacid salt with acid salt. If any objection existed to this, it could be readily met by the addition of sodium bicarbonate to each dose—as suggested above—whereby the diacid salt is alkalized to the official acid salt.

The official sodium phosphate in solution, while chemically an acid salt—in that its molecule contains replaceable basylous hydrogen atoms—is physically alkaline in reaction. On the other hand, the diacid sodium phosphate is acid both chemically and physically, while the remaining salt of the group of orthophosphates—the normal sodium phosphate—is alkaline in reaction, and its solution, exposed to air, absorbs carbon dioxide to yield sodium carbonate and the acid phosphate.

SPERMIN. the first of the organo-therapeutic remedies, is still in good demand. According to G. Hirsch it has no specific action in certain diseases, and has therefore lost its original reputation as an aphrodisiac, in part. But it seems to be a physiological chemical agent, that regulates intra-organic oxidation, promotes the removal of products of excretion and decomposition formed in the organism, thus relieving the nervous system and permitting undisturbed action of the healing powers of nature. (Südd. Ap. Ztg.).

SOLUBLE COMPOUNDS OF FORMALDEHYDE FOR DISINFECTION.—According to Oppermann, powerful disinfectants are obtained when formaldehyde is brought together with tartrates, boric acid, salicylic acid, carbolic acid, a mixture of carbolic acid and menthol, or boric acid and tannin, etc., by means of ammonia. The compounds so obtained form mostly amorphous, stable, water-soluble products, that split up under certain conditions into their constituents. (Ztsch. Ang. Chem.).

* Read by invitation before the Philadelphia County Medical Society, May 11, 1898. Reprinted from Philadelphia Polyclinic.

PHARMACY.

PASTILLES FOR ANÆMIA.—Nouv. Rem. gives the following formula: Sodium bicarbonate, calcium phosphate, sodium chloride, sugar of each 0.25 gm. (4 grains), reduced iron, 3 grains, to make one pastille. Dose, 4 to 6 daily.

REMOVAL OF INK FROM HECTOGRAPH.—It is recommended in *Südd. Ap. Ztg.* to pour crude hydrochloric acid upon the hectograph, rub with a wad of cotton, then wash off by holding under cold, running water and drying with a cloth. The hectograph may be used again immediately.

DUSTING POWDER FOR PERSPIRING HANDS.—

Zinc oleate	10 parts
Bismuth subnitrate	20 parts
Beta-naphthol	1 part
Starch	69 parts

—(*Südd. Ap. Ztg.*)

DETERMINATION OF DOSES FOR CHILDREN.—

Pedersen (*Ph. Ztg.*) calculates the dose for a child from that prescribed for an adult by dividing the latter by 20 and multiplying the result by the number of years the child is old. These figures are well in accord with the customary doses of toxic substances for children.

DECOLORATION OF FATS AND OILS.—Many fats and oils contain oleate of iron, which gives them a brown color. It is best removed by treating the fat, dissolved in petroleum, with sodium sulphide. This causes the iron to separate in form of ferrous sulphide, which may be removed by filtering through a cloth saturated with petroleum. (*Seif.-Fabr.*)

BISMUTH DRESSING FOR BURNS.—Dr. v. Bardeleben has introduced an antiseptic dressing containing bismuth for burns and various skin diseases. It is not stated in what form the bismuth is used. The dressing not only relieves the pain of wounds, but also heals them rapidly without necessitating a change of the dressing. Favorable results have also been obtained in treating eczemas, abscesses, eruptions, etc. The dressing is sold under patent and trademark. (*Ph. Post.*)

PREPARATION OF CITRATES AND TARTRATES

FREE FROM LEAD.—L. de Koninck has found it impossible to obtain ammonium tartrate free from lead by recrystallization. Solutions of tartrates and citrates could be freed from lead by hydrogen sulphide, shaking with kaolin and filtering, but when the solutions were evaporated and crystallized, the salts always contained small quantities of lead, taken up from the glass or porcelain vessels. (*Ztsch. Ang. Chem.*)

GUAIACOL CARBONATE has been used with good success by Bannatyne in the treatment of rheumatoid arthritis. He gives it in doses of 5 to 15 grains, three times a day, rapidly increased to six times, when its effect is soon marked. He believes it to act locally on the alimentary canal before absorption, and afterwards favoring the elimination of the toxic albumins with which it combines. In conjunction with this treatment, pure guaiacol in equal proportion with olive oil is painted on the affected joints nightly.

NEW OINTMENT BASE.—A method for treating oils to increase their solvent and absorptive powers has been patented by W. E. Pearson in Hamburg, the manufacturer of vasogen. The process consists in adding 20 per cent. of oleic acid and drying at a temperature not exceeding 120° C. cooling to 80° and mixing with an alcoholic solution of alkali, to the extent of 10 per cent. The product is clear and remains liquid at ordinary temperatures. It readily takes up aromatic resins, iodoform, iodine, turpentine, camphor, phenols, menthol, etc. (*Ph. Post.*)

SIROLIN is a preparation purporting to consist of the medicinally active constituents of beechwood tar, principally guaiacol. Contrary to other guaiacol preparations, it is readily absorbed by the organism, and well borne, according to the promoters. It stimulates the appetite, stops night sweats and improves nutrition. The preparation is recommended in maladies of the respiratory organs, whooping cough, asthma, colds, etc. It is readily taken by children, because of its agreeable taste. The dose is a teaspoonful three times daily in water, milk or wine, for adults. The dose for children is a teaspoonful once or twice daily. (*Ph. Post.*)

INFLUENCE OF DRINKING WATER ON THE

TEETH.—The question to what extent the alkaline earth salts in drinking water affect the decay (caries) of teeth has of late been studied in several quarters. Statistics have been collected by Röse in several localities in Bavaria and by Foerberg in Sweden. These have revealed the interesting fact that the extent of decaying teeth bears a definite relation to the hardness of the water, in other words, to the quantity of calcium and magnesium salts in the earth, through which the water passes. The harder the water, the better the teeth; the smaller the quantity of these salts, the greater the decay of the teeth. (*Südd. Ap. Ztg.*)

SOLUTION OF IODINE IN MINERAL OILS.—

According to H. H. Lake, the solutions of iodine in heavy mineral oils, as prepared in the customary manner, with or without addition of fats, oils or oleic acid, have no therapeutic value, as in such mixtures iodine is not present in the free state, but is chemically combined. Lake prepares the solutions in the following manner: The oils are first mixed with 2 to 7 per cent. of caustic alkali. The mixture is heated to 100° to 200° C., under circumstances with further addition of 5 to 20 per cent. of oleic acid, and a continuous stream of oxygen passed through it. The iodine (2 to 5 per cent.) is then gradually added, forming a solution of uncombined iodine. (*Ztsch. Ang. Chem.*)

EUCALINE B. according to Prof. Reclus (*Bulletin Medical*), is 3½ times less toxic than cocaine, and its solutions are stable. Cocaine solutions change so they cannot be used after a period of fifteen days, while solutions of Eucaline B. more than four months old, have been used in long and delicate operations with perfect satisfaction. In summing up the comparative merits of cocaine and Eucaline B. Prof. Reclus says: 1. Cocaine, well and prudently administered, seems to us to remain the best anæsthetic; 2. Eucaline B. stands very little behind it, and is to be preferred in dentistry and in such other cases where the field of operation is extensive, and requires the employment of a large quantity of the anæsthetic substance. Under these latter circumstances especially, Eucaline B. less toxic, has important advantages.

ACTION OF COPPER ON THE ANIMAL ORGANISM.

—Notwithstanding many experiments on this subject, there are still many open questions, and one of them, whether some copper combinations are more poisonous than others, has been investigated by Baum and Seeliger. A large number of experiments were made with cuprohemol, copper sulphate, acetate and oleate on twenty-eight animals (sheep, goats, dogs and cats). They extended over three years, and included chemical, microscopical and physiological experiments. The results were in outline as follows: (1) It is possible, by long continued administration of small, not acutely irritant doses of copper, to produce chronic copper poisoning. (2) This is in general characterized by loss of flesh and appetite, weakness, finally convulsions and death. Dissection shows pathological changes in liver and kidneys, and deposition of considerable quantities of copper takes place. (3) The power of resistance differs with the animals; cats are the most sensitive, and the most toxic preparation is the oleate. The acetate is next in toxic power, then the sulphate, while cuprohemol is comparatively innocuous. (*Südd. Ap. Ztg.*)

BENZIN VARNISHES AND POLISHES are prepared by Ossowietzky (Ph. Ztsch. Russ.) in the following manner: The resins are melted in a hermetically closed kettle, with addition of boric acid, and after cooling, moistened with methyl alcohol. The resins so treated are liquid and dissolve completely in benzin. The resins used are white and yellow shellac, sandarac, mastic, etc., either singly or mixed, depending on the effects desired. The proportions of resin, boric acid and wood spirit vary with the quality and nature of the resin; in no case must the boric acid exceed 5 per cent. of the resin used, and the quantity of alcohol is never more than a weight equal to that of the resin, even with the hardest and least fusible. The benzin varnishes are expected to replace those made with alcohol, being cheaper and requiring less time and labor, on account of the greater volatility of benzin. (Drog. Ztg.).

EXPERIMENTS WITH NICKEL COOKING UTENSILS.—In view of the divided opinions as to the admissibility of nickel utensils for general use in the preparation of food, Prof. Ludwig (Oest. Chem. Ztg.), has made extended experiments from a chemical and sanitary standpoint. During two and a half years nickel utensils exclusively were used in the author's household. They consisted of 98 per cent. nickel, and 2 per cent. other metals, including copper, manganese, aluminum and cobalt. Only minute quantities of nickel were taken up by most foodstuffs, those containing considerable quantities of acid taking up the most. The largest quantity found was in sourkruit, namely 0.0729 per cent. During the two and a half years that food prepared thus exclusively was eaten by eleven to twelve persons of from 6 to 56 years of age, not a single disturbance of health was noticed that could be traced to the action of nickel. It seems questionable that nickel in the form it exists in foods, is absorbed by the organism. Repeated examinations of large quantities of urine, after eating food containing nickel, never showed a reaction for this metal. (Ap. Ztg.).

FORMATION OF CHLOROPHYL.—W. Palladine (Compt. Rendus, Sci. Amer.), finds that oxygen is essential for the reproduction of the green color in etiolated leaves, and in greater quantity than is necessary for respiration. Thus when leaves which had been etiolated for forty-eight hours in the dark in a 10 per cent. solution of saccharose were exposed to the light, immersed in water in a test tube, it was found that the green color was restored most rapidly to those leaves which were in the upper part, in contact with the air, although the light was equally distributed over the whole length of the tube. The action of solutions of various carbohydrates on the formation of chlorophyll was also experimented with. Thus leaves almost entirely free from carbohydrates were obtained by etiolating them in boiled water. A portion of these, when exposed to light, still immersed in water, showed scarcely any development of chlorophyll. When immersed in a 10 per cent. solution of saccharose, however, an intense green color was developed; raffinose in a 5 per cent. solution acted in a similar manner. Dextrose and fructose gave rise to the green coloration somewhat more slowly, and with galactose, for the first five days, the leaves showed no color; after then the color developed very rapidly. Dulcitol solution, mannite, asparagin, urea, alcohol and ammonium hydrochloride prevented the formation of chlorophyll, while inulin and tyrosin appear to be neutral in their action.

THE TIME FOR TAKING MEDICINES.—Dr. E. Vogt makes a number of interesting observations on this subject in Rev. de Therap. Most remedies may be taken without disadvantage either before or after meals, or on an empty stomach. If, however, the remedy is an irritant, it is important to introduce it into the stomach in not too small a volume. Therefore, if such a substance is soluble in water, it should be taken in a highly diluted solution; if it is insoluble, it is best given with meals. The form of the remedy is also of importance. Thus, hard pills taken on an empty stomach may irritate, as

also wafer-capsules, whose contents are distributed at first only through a limited space in the stomach in concentrated form. But when such capsules, e. g., containing sodium salicylate, are taken with the meal, the contents are diluted at once with the food, and cannot cause local irritation of the mucous membranes of the stomach. Whenever a rapid effect of a remedy is desired, it is best given before meals, but always highly diluted, as the stomach is usually sensitive to strong solutions. Many remedies prevent or retard digestion, as chloroform, naphthol, saccharine, etc. Such should not be administered until digestion is nearly or entirely finished. This applies also to metallic salts, the iodides and bromides, mercury salts, etc., which should be taken with much water, either early, before breakfast, or late at night. Bitter tonics are best taken at the moment of beginning the meal, but not a half hour before the meal. To take cod liver oil before meals is irrational, as digestion is hindered through the coating of oil formed on the walls of the stomach. It is taken to best advantage either after eating or else at least an hour before. Sodium bicarbonate, taken before meals, causes a too great production of gastric juice; taken after meals, it neutralizes an excess of hydrochloric acid. (Südd. Ap. Ztg.).

THE VALUE OF FRUITS.—Fruits are of great value in many forms of disease, says Modern Medicine (Sci. Am.), because of the acids which they contain. These acids, when taken into the blood, break up some of the compounds of waste substances which have been formed, and thus give rise to an increased excretion of these substances through the kidneys. In this way fruits are a great advantage in the treatment of rheumatism, gout, gravel and all the different morbid conditions which accompany the so-called uric acid diathesis. The observations of Haig respecting the relation of uric acid to neurasthenia give to fruit a great diastetic value in this disease. He has shown that neurasthenia is almost always the result of an accumulation within the system of tissue wastes largely in the form of uric acid. The free use of fruits aids in the elimination of these poisons, not only by breaking up the compounds which they form within the body, but by stimulating the kidneys to increased normal activity. Remembering the interesting fact pointed out by Bouchard, that rheumatism is really a toxemia, resulting from the decomposition of food stuffs in a dilated or prolapsed stomach, we may also attribute the beneficial effects of a fruit diet in rheumatism and allied conditions to its value in suppressing the formation of poisonous substances in the alimentary canal in the manner already pointed out. Obesity, which is, like rheumatism, a diathesis, may be successfully treated by a food dietary. This is due not only to the fact that fruit is a natural food, and thus aids the system to establish normal tissue metamorphosis and a normal balance between the processes of assimilation and dissimilation, but also because it affords a very comfortable means of reducing the amount of nutrient material received in a minimum quantity. Fruit is chiefly water, the amount of nutrient material it contains varying from five to eight to ten per cent. In most fruits, rising to a higher figure only in dried fruits, such as dried grapes, prunes, dates, etc. The writer has succeeded in reducing excessive weight in the most satisfactory manner, by prescribing a diet consisting almost exclusively of grapes or apples, allowing only a small bit of thoroughly dried bread or zwieback in connection with the fruit. In some cases the fruit may be allowed as often as three or four times a day, if necessary to relieve an uncomfortable sensation of emptiness. In fevers, fruits, especially in the form of fruit juices, are a most convenient and certainly the most appropriate of all foods. It is now almost universally recognized that beef tea and meat preparations of all sorts should be wholly proscribed in cases of fever, as the patient is already suffering from the accumulation of waste matters to such a degree that the addition of even the small amount contained in beef tea or a small piece of meat may be sufficient to give rise to an exacerbation of the disease and lessen the patient's chances for recovery.

HERBALISTS IN THE PHILIPPINES.

The gurus and superstitious practices of the sage and medicine of ancient Rome have a modern parallel among the natives of the archipelago where Admiral Dewey's squadron is now stationed, if the statements of a Spanish pharmaceutical journal may be accepted as accurate. Five millions of the native inhabitants of the Philippines, it is stated, rely exclusively upon and believe implicitly in the herbalists, and apply to them in all cases of illness. Various herbs and roots are credited with wondrous powers when manipulated by skillful practitioners. These are divided into various classes, each having its specialty. The "Magligau" supplies resistless love philters for the fair sex, while the herbs prepared by the "Mangagayama" for rejected lovers are warranted to turn the lady's scorn to the tenderest affection. The "Manoculum," who supplies an herb which, rubbed over the body, preserves it from the flames during the fiercest conflagration, would be a handy man during a street fire or a bombardment. Others supply substances for ensuring the lingering death of foes, while the "Iubu" confines himself to the more legitimate business of curing the maladies that the Indian flesh is heir to.

MERCHANTS' ASSOCIATION EXCURSIONS.

The Merchants' Association of New York has again overcome the conservatism of the railroads represented in the Trunk Line Association and in the Joint Traffic Association, and has arranged for special excursions from August 7 to September 14, to New York City, from territory extending west to Chicago and St. Louis, south to the Ohio River, Baltimore and Washington, east to New England and north to Canada. The privileges of the reduced rates will be extended to the members of the Merchants' Association and to the immediate members of their families as well. The price of each ticket will be at the rate of one fare and one-third for the round trip from the point of departure. Tickets for the first of these excursions will be good for thirty days. Tickets for the second, beginning on September 1, will be good for fifteen days. More detailed information concerning these excursions may be obtained from the secretary of the association, New York Life building, New York City.

SCIENTIFIC PROGRESS IN THE LAST DECADE.

A contributor to *La Nature* (Literary Digest) remarks that the best reply to the attitude toward modern science of certain critics who profess to make light of what they call its pretensions, and who magnify its failures, is to enumerate some of the wonderful discoveries and inventions of the last few years. This he does in the following brief though striking fashion.

"Suppose that a man had fallen into a trance just after the closing of the Exposition of 1889, that is, less than nine years ago, and consequently knew nothing of the progress that has been made since that time, up to the period of our next great international manifestation. His admiration and his study would be devoted to the following objects:

1. The bicycle, which is revolutionizing our habits, and which existed in his time only in rare specimens, bulky indeed compared with the little queen of our day.
2. The horseless carriage, moved by petroleum or electricity, whose future is perhaps even more promising than that of the bicycle.
3. The electric railways, which scarcely existed in 1889, and which will modify in the next century the conditions of working of the great trunk lines.
4. Polyphase currents, which enable us to transmit and distribute natural motor forces at great distances.
5. The Lavoisier steam engine, the new process of our day, the industrial standpoint—for utilizing steam at high pressure.
6. The interior-combustion motor of M. Diesel, which is the most economical means now known for transforming heat into work.
7. Calcium carbide, which gives rise to acetylene, one of the illuminants of the next century.
8. The cinematograph, with which we have been recently filled with wonders to the point of saturation.
9. The Roentgen rays, which are revolutionizing the healing art.
10. To these nine discoveries or great inventions, whose results are already ours and whose benefits we enjoy daily, we may add:
10. Liquid air for industrial purposes.
11. Color photography, in which the latest results of Messrs. Lumiere have just been presented to the Academy of Sciences by M. Mascart.
12. Wireless telegraphy, a process full of promise.
13. Cold light, obtained by luminescence of rarefied gases traversed by the electric current.
14. High-frequency currents, with which Tesla and D'Arsonval have conducted such marvelous experiments.

"In less than ten years, solely in the domain of mechanics and physics, we have fourteenth century discoveries which are to be added to the already long list of the scientific conquests of the nineteenth century, and which we should have to explain to our sleeper on his awakening."

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.
Requests for information are not acknowledged by mail and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers.

Queries From Non-Subscribers Not Answered.

W. H. McLeod, Kansas City, Kan., will please read the rules for the conduct of this department. See top of this column.

Terra Fusus.

(H. C. A.) "Terra Fusus" is a so-called "fruit and vegetable preservative," exploited by the manufacturers of "black pepsin," "per algretta" and other "fake" preparations. The claims made for "terra fusus" stamp it one of like ilk. See this journal, April 7, 1898, page 512.

Manufacture of Photographic Dry Plates.

(H. E. A.) Dry plates for photographers are now manufactured in such large quantities by machinery that it is rarely beneficial so far as cost is concerned for the amateur to attempt to manufacture his own. However, a method for preparing dry plates by hand may be found in this journal, August 26, 1897, page 271.

Red Fruit Coloring.

(J. F. S.) Fuchsine is used in the following formula:

Fuchsine S.	.....	1/4 ounce
Alcohol	.....	2 fl. ounces
Water	.....	14 fl. ounces

Shake the aniline with the alcohol, then add the water.

This solution is said to make a brilliant color, not impaired by acids. Two fluidrams are sufficient to color one gallon of syrup a deep red.

Tannic Acid and Morphine Sulphate.

(W. H. W.) A clear solution cannot be made from the following:

Tannic acid	.....	1/4 dram
Heracleic acid	.....	1/2 dram
Morphine sulphate	.....	10 grains
Water	.....	2 ounces

Tannic acid is incompatible with morphine sulphate, the compound formed being insoluble in water. The prescription should not be dispensed.

Filters.

(H. M. S.) Please repeat your query and tell us more specifically what you want, and we will try and help you out. If you merely wish a household filter of the charcoal and sand variety, you can probably obtain one from some hardware dealer in your own neighborhood. A very good water filter considerably used in this locality and adapted to domestic and other uses is the "Bührling," manufactured by the Bührling Water Purifying Company, No. 12 West Broadway, this city. A small size, which may be attached to the water supply of the house or fed by a pump, has a capacity of filtering about fifteen gallons per hour. There are others.

Ferric Citrate and Phosphoric Acid.

(F. P.) has had difficulty with the following:

Strychnine sulphate	.....	
Arsenous acid, of each	.....	.03 grams
Dilute phosphoric acid	.....	15.00 c.c.
Ferric citrate	.....	8.00 grams
Syrup	.....	80.00 c.c.
(a) cinnamon	.....	.06 c.c.
Water enough to make	.....	120 c.c.

The difficulty here is due to the incompatibility between dilute phosphoric acid and ferric citrate, iron being precipitated as ferric phosphate, a salt nearly insoluble in water and not so very readily soluble in weak acid solutions. This difficulty may be overcome by using an equivalent amount of the diluted metaphosphoric acid of the

National Formulary in place of the official orthophosphoric acid. Such substitution should not be made, however, without consulting the physician, who should be informed of the difficulty.

Nectar Syrup for the Fountain.

(W. A. S. H.) We are not familiar with the particular formula you name. One of the following may serve your purpose:

Extract vanilla	4 ounces
Extract rose	4 ounces
Extract lemon	4 ounces
Extract bitter almond.....	4 ounces

To make nectar syrup add 4 ounces of the above extract to 1 gallon of syrup. The syrup may be tinted red with solution of cochineal if desired.

Nectar syrup may also be prepared from the following formulas:

- (1) Essence bitter almond..... 8 drops
Orange flower water, fresh..... 6 fl. drams
Pineapple syrup 10 fl. ounces || Raspberry syrup | 2 fl. ounces |
| (2) Pineapple syrup | 3 fl. ounces |
| Strawberry syrup | 3 fl. ounces |
| Raspberry syrup | 2 fl. ounces |
| Orange flower water..... | 2 1/2 fl. ounces |
| Citric acid | 1/2 ounce |
| Sherry wine | 8 fl. ounces |
| Syrup | 3 pints |

Use pure fruit juices and the best sherry wine.

Ammonium Carbonate and Infusion Digitalis.

(A. F. P.) asks if the following prescription can be dispensed:

Gualacol	8 grams
Oil gaultheria	2 grams
Powdered acacia	
Water of each enough to make an emulsion.	
Ammonia carbonate	12 grams
Infusion digitalis enough to make.....	90 grams

Yes. With 8 grams of powdered acacia and 16 grams of distilled water, make an emulsion containing the gualacol and oil of gaultheria, and to it add about 16 grams of the infusion of digitalis. In the remainder of the infusion (about 34 grams) dissolve the ammonium carbonate and gradually add to the emulsion containing the gualacol and oil of gaultheria. The mixture should be sent out under the customary shake label. If desired a heavier mixture may be made by increasing the quantity of acacia. It must be noted, however, that ammonium carbonate is gradually decomposed by the infusion of digitalis and the patient should be cautioned to loosely cork the bottle in order to allow the escape of the carbonic acid gas liberated in this decomposition.

Kola-Coca.

(W. A. S. H.) Bonham's Guide is authority for this formula:

Kola wine	8 ounces
Coca wine	8 ounces
Simple syrup	3/4 gallon
Albumen foam	2 ounces

Color with caramel and cochineal.

The same authority gives the following for "Kola-Coca Malt Phosphate":

Extract of malt.....	2 pounds
Kola wine syrup.....	3 pints
Coca wine syrup.....	1 pint
Cinchona wine syrup.....	1 pint
Pure orange wine.....	1 pint
Spirit of rose.....	1 1/4 fl. ounce
Acid solution of phosphates.....	8 fl. ounces

The kola wine syrup is made by adding two pints of kola wine to 3 pints of simple syrup. The coca wine syrup is made by adding 2 pints of coca wine to 3 pints of simple syrup.

Here is a formula for

Kola-Coca Syrup.

Fluid extract kola.....	1 1/2 fl. ounce
Wine of coca	2 fl. ounces
Syrup, enough to make.....	32 fl. ounces

Serve "solid" by drawing an eight ounce glass seven-eighths full of carbonated water drawn with coarse stream, adding about 1 fluid ounce of the syrup, and stirring with a spoon.

Grafting Wax and Dressings Used in Pruning.

(J. L.) One of the best grafting waxes is made by melting four parts by weight of rosin, one part beeswax and one part tallow. When thoroughly melted, pour into cold water; when cool enough, take out and work by molding and pulling until it becomes quite stiff. It is necessary to have the hands well greased with tallow while handling this wax.

Grafting Clay: One-third fresh cow-dung, two-thirds clay, with a little plaster hair. Thoroughly mix and allow to dry until about the consistency of fresh putty. This paste has been recommended by the U. S. Department of Agriculture as an application for surface wounds in the trunk or large limbs of trees. The paste when applied keeps the surface of the wound from drying out.

Coal tar and pitch mixture may also be applied to wounds after they have been cleaned, pared, and allowed to dry enough so that the material will stick. Thick tar is said to be one of the most easily applied and best dressings there is. The coal tar may be thickened by burning it in an iron kettle until it reaches the desired consistency, when it is painted on the wounds while still slightly warm. Thus prepared it dries quickly, forming a hard, glazed surface, which does not crack or peel off, as is the case with pitch, shellac varnish, paint, etc. Shellac varnish is said to be a very good dressing for wounds made in pruning, but, as noted above, it is more liable to crack and scale off than coal tar, and it is more expensive.

Bluing of Steel.

(E. F. R.) We compile the following formulas:

(1) Scour the steel with a small quantity of a strong aqueous solution of soda, rinse in water, warm and brush over with a solution of 1/4 ounce chloride of iron dissolved in 5 ounces of water and let it dry; then apply in the same manner a solution of 1-5 of an ounce pyrogallie acid in 1 ounce of water, dry and brush. This application is said not to wear well without lacquering. The blue oxide is sometimes imitated by using a thin alcoholic shellac varnish, colored with aniline blue or Prussian blue.

(2) The articles to be blued should have their surface cleaned and polished. They may be then heated in fine clean wood ashes to a temperature of from 500 to 600° F., according to the depth of color required. It is not necessary to watch the temperature, but simply to examine the articles from time to time to see when cooled in the air they assume the proper color. The operation is completed upon removing the articles.

(3) To blue iron and steel without heat, make two solutions:

- (a) Potassium ferricyanide
- Water
- (b) Solution ferric chloride.....
- Water

Mix the solutions, and in the mixture dip the articles to be blued.

- (4) Antimony trichloride
- Fuming nitric acid
- Hydrochloric acid

Apply with a rag and rub with a rag until the proper color is obtained.

Lubricants and Lubricating Oils.

(W. A. S. H.) Your inquiry for a method of diluting a lubricant is very indefinite, for you do not give us any information regarding the composition of the "lubricating oil" you have, neither do you mention the kind of work you propose to do with it. A knowledge of these factors is most important, for the suitability of a lubricant depends on the work to be done and it is not constant. In order to procure the nearest possible approach to what is required for special purposes, it is generally customary to provide mixtures of mineral and animal or vegetable oils in proportions calculated to give the particular properties required. One writer on the subject says there exists a marked connection between viscosity and horse-power, and to ensure perfect lubrication, the viscosity (the property of glutinousness or tenacity) must gradually increase with the ponderousness of the machinery. With this object in view, it is stated

that the best method of mixing oils for lubricants is to take a basis of mineral oil of 0.855 to 0.903 specific gravity and add olive, lard, rapeseed, or castor oil to work up the viscosity. Olive and lard oils when mixed with mineral oils in proportions of 10, 20, 25 and so on up to 75 per cent. are about equal in value as lubricants for the lighter class of machinery. Rapeseed oil in like proportions is also valuable. Castor oil, mixed with mineral oil in varying proportions, may be used in the case of the most ponderous machinery. Cold mixed oils are considered preferable to those mixed at a temperature over 100° F. By experimenting a little with the oils named and others which may suggest themselves, you should have but little trouble in producing a mixture of the right degree of fluidity.

We give a formula for a fluid lubricant taken from an English publication. It is said to be suitable for various parts and kinds of machinery and is made by mixing the various oils at about 100° F.:

Lard oil	2 parts
Palm oil	1 part
Cotton seed oil	3 parts
Crude paraffin oil	2 parts
Petroleum	2 parts

Violet Water.

(G. W. S.) Two formulas from the Era Formulary may be found in this journal, May 6, 1897, page 542. Here are some others from Griffiths' "Non-Secret Formulas":

First Quality.

(1) Tincture of violet	32 ounces
Tincture of cassia	16 ounces
Tincture of rose	16 ounces
Tincture of vanillin	16 ounces
Tincture of orris	32 ounces
Oil bergamot	1/2 ounce
Oil bitter almonds	5 drops
Cologne spirit	88 ounces
Rose water	40 ounces

Dissolve the oils in the spirit; add the tinctures, and set aside for three days; then add the water slowly, stirring well, and let stand for two weeks before filtering. Color with chlorophyll to the tint required.

Second Quality.

(2) Tincture cassia	32 ounces
Tincture orris	64 ounces
Tincture vanillin	16 ounces
Tincture ambrette seed	8 ounces
Oil bitter almonds	5 drops
Oil bergamot	1/2 ounce
Cologne spirit	64 ounces
Rose water	72 ounces

Proceed as above.

Third Quality.

(3) Tincture orris	64 ounces
Tincture vanillin	16 ounces
Oil sandalwood	1/2 ounce
Oil bergamot	1 ounce
Oil rose geranium	1/2 ounce
Cologne spirit	80 ounces
Rose water	96 ounces

Dissolve the oils in the spirit; add the tinctures, and set aside for 3 days; then add the rose water slowly, stirring well, and let stand for two weeks before filtering. Color with chlorophyll or aniline green to the tint required.

Ionone, a so-called "artificial perfume of fresh violet flowers" is quite extensively used to impart a violet odor to all violet preparations. In using it for extracts, powders, sachets, toilet waters, etc., it is customary to "fix" the solution, properly diluted, with orris oil, civet, musk, etc. We do not answer queries by mail.

Screw Worm in Cattle.

(W. H. W.) The screw worm (*Campomyia* (Lucilia) macellaria), is the larva of a fly found all over the country, but most liable to be met with in Texas and adjoining States. The fly is slightly larger than the common house fly, of a bright metallic green, with three black stripes upon its back. Its eyes are dull red and very prominent. It lays its eggs in great abundance in wounds or natural openings of animals or men. These hatch a small white grub in from two to ten hours (some claim in as many minutes). The young larvæ at once bore their way into the flesh, making a deep, running wound. The odor is very characteristic and serves to attract more flies. These lay their eggs and a new lot is hatched. If left alone, the animal will die from blood-poisoning in a short time. The mature grub is about

three-fourths of an inch long and one-eighth of an inch in diameter. It tapers toward the head and there has two sharp, black hooks by which to hold on. The body is divided into segments, and these are clothed with a circle of stiff bristles, giving it the appearance of a screw.

The treatment is to get the worms from the wound and let it heal. By injecting into the wound chloroform, solution of corrosive sublimate (60 grains to 1 pint of water), calomel, crude carbolic acid, kerosene, turpentine, creosylic ointment, or fresh pyrethrum, the worms will be killed or driven from the wound. If the wound is carefully washed out and the flies are kept away it will soon heal. Corrosive sublimate and calomel will sometimes affect the stock with mercurial poisoning, especially if put where they can lick the wounds. The carbolic acid and corrosive sublimate are good antiseptics and will aid the wound in healing. An ointment recommended by some veterinarians consists of petrolatum containing about 6 to 8 per cent. of creosylic acid. Preventive measures are to put tar, grease, or fish oil on all wounds every day until healed. Keep stock free from ticks, as half the cases of the attacks of screw worms are said to start at a place where a tick is killed, giving the necessary blood in which to lay the eggs. All dead animals should be burned or buried at least two feet deep to prevent the flies from laying their eggs in the carcasses or those already laid from escaping. Information bearing upon the treatment of cattle affected with this pest may be found in bulletins issued by the Agricultural Experiment Stations of Louisiana, Mississippi and Texas.

A RUBBER-SUBSTITUTE FROM CORN.

The latest alleged discovery of a substitute for India-rubber is to be credited to Chicago. The chemists of the Glucose Sugar Refining Co., after several months of experimenting with the oil derived from corn, claim to have found that, by vulcanizing it in connection with an equal quantity of crude India-rubber, a substance is produced equal for certain purposes to the best native gum, at a greatly lessened cost. The new "corn rubber" is claimed to possess all the essential qualities of Pará rubber, including resiliency, and the discoverers of the new product are hopeful of being able to utilize it for bicycle-tires. The reported discovery has been hailed with delight in the corn-growing States of the West, as likely to increase the already important demand for grain for the purposes of the Glucose Sugar Refining Co. One of the largest plants is located at Marshalltown, Iowa, where already the interest in the new rubber substitute has extended. The company have factories also in Chicago and at Peoria and Rockford, Illinois, and at Davenport, Iowa. A price of 10 to 12 cents per pound has been named for the new product, *i. e.* b. Chicago.

A sample of this substitute has been received by the editor of "The India Rubber World," through the courtesy of Mr. Matthiessen, the president of the company. As it was only a small one it was impossible to thoroughly test it. Its physical characteristics, however, appear to be very similar to those of the substitutes made from rape seed and cotton seed oils. The claim that the manufacturers make, that "50 per cent. of their substitute with pure rubber will produce as good and in some cases better results for certain purposes than will pure rubber itself," does not mean much to the practical rubber compounder; for the same thing is true of a host of cheaper materials. For example: 50 per cent. of whitening "with pure rubber will produce as good and in some cases better results for certain purposes than will pure rubber itself." Further than this, there are very few practical compounds made up on any such basis. If, however, this corn-oil substitute can be added to reclaimed rubber and a valuable result attained, it will interest the trade exceedingly, but to mix a certain percentage of it with Pará rubber and get a good result, will not convince the rubber manufacturers of its value, because almost anything on earth can be thus mixed and the result be apparently good.

PROTECTION FROM FLIES.—The following solution is recommended to protect horses, etc., from flies: Oil of clove, tincture of eucalyptus, of each 3 parts; oil of cassia, 5 parts; alcohol, 150 parts; water 200 parts. (Sudd. Ap. Ztg.).

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, JUNE 16, 1898.

No. 24.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum.
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL..... 895	Mr. Muir retires; Board of
How the Brain Works.... 898	Trade Wants Stamp Tax
ERA COURSE IN PHAR-	Reduced..... 916
MACY..... 899	Stars and Stripes in Ha-
Pharmaceutical Processes. 899	wall..... 917
Dr. Megaphone Quacken-	NEWS LETTERS..... 917
boss..... 906	BUSINESS RECORD..... 923
Spanish Army Pharmacists 909	Ohio Pharmaceutical As-
Determining Arsenic Con-	sociation..... 924
tents in Mineral Acids.. 910	Missouri Pharmaceutical
PHARMACY..... 911	Association..... 926
QUESTION BOX..... 912	Illinois Pharmaceutical
NEWS AND TRADE DE-	Association..... 928
PARTMENT..... 915	Colleges..... 929
War Revenue Bill; Schief-	OBITUARY..... 929
feldin & Co. No Longer to	Outing of the New York
Handle Farbenfabriken	College Alumni..... 930
Products..... 915	STATE OF TRADE..... 931
	MARKET REPORTS..... 932

THE ERA COURSE IN PHARMACY

Consists of lectures prepared by leading pharmaceutical educators, and published weekly in The Pharmaceutical Era. Quizzes and Examinations are conducted by mail. Question blanks upon each lecture are sent to students, and their answers duly rated are returned with corrections by the instructors.

The course is graded and covers in scope all the subjects included in the college curriculum. The course is divided into two years, junior and senior, of about 40 weeks each.

More than 1,000 Students in the junior class for 1897-98. Send for full Prospectus, now in preparation, giving details of courses, manner of conducting it and terms for tuition, etc.

Address,

THE PHARMACEUTICAL ERA,

Box 1483, New York.

STAMP TAX NOT SO BAD AS IT MIGHT BE.

As it at last left the hands of Congress, the War Revenue bill is a more satisfactory measure to the business interests of the country than business men had dared to hope for. This is true of those provisions affecting the drug trade, as well as of various other parts of the act. The feeling in the trade immediately after the passage of the bill was that proprietors and dealers were "out of the woods," and that the opening was more favorable than they had expected to find it. The drug trade was perfectly willing to bear its share of the burden of taxation necessitated by the present war. But it did not want to be overtaxed, while others, better able to pay taxes, should be passed by. A fear existed in the trade that the stamp taxes it would be called upon to pay were going to be oppressive. The Senate did its best to impose a stamp tax on proprietary articles of 4 per cent. of the retail price. In fighting that proposed provision, The Pharmaceutical Era, and others having in mind the best interests of the trade, tried to secure a tax rate of 1 per cent. Although not succeeding in this, a material reduction was obtained. Two and one-half cents on the dollar is a more equitable rate than four cents. The drug trade is fairly well satisfied with this reduction, and will pay its stamp taxes willingly and promptly.

STAMP TAXES ON DRUG TRADE.

The War Revenue bill as finally passed by Congress, imposes the following stamp taxes which will affect the drug trade:

WHAT IS INCLUDED.—Revenue stamps must be affixed to every enclosure containing any proprietary medicinal preparation or article, or any essence, extract, toilet water, cosmetics, vaseline, petroleum, hair oil, pomade, hair dressing, hair restorative, hair dye, tooth wash, dentifrice, tooth paste and similar substances or articles; to every package of chewing gum, and to every bottle of sparkling wine.

RATE OF TAX.—On proprietary medicinal articles, perfumery and cosmetics, $\frac{1}{2}$ of one cent for each 5 cents in retail price.

On chewing gum, 4 cents on each package of retail value of \$1.00 or less.

On wines, sparkling or other, bottled, 1 cent for each pint or less; 2 cents on bottles containing more than one pint.

GOODS IN STOCK.—Articles on hand on July 1 will be subject to the tax, but dealers who are not manufacturers may affix the stamp when the article is sold at retail.

PRIVATE STAMPS.—Manufacturers of proprietary medicinal preparations and articles have the privilege of furnishing their own designs for special revenue stamps.

PENALTY for evasion of stamp taxes, fine of \$500 or imprisonment for six months.

The Apprentice.

Mr. Bodemann is a trifle caustic in his remarks on the apprentice question, embodied in his report to the Illinois Pharmaceutical Association last week, but there is a lot of truth in them.

Mr. Bodemann is not prone to mince words and pick his phrases, but talks straight at his subject in vigorous and unique fashion. That's why we like to listen to him, and we generally agree with him. He is certainly right in the assertion that too-poorly-prepared boys are admitted to the practice of pharmacy. If there is any calling which requires a good general preliminary education it is pharmacy. But much remains to be desired in this respect. Colleges and boards of pharmacy are most of them endeavoring to make haste slowly, but they cannot get too far ahead of existing conditions and existing demands. The inertia of the profession itself must be overcome. If the members of the retail drug trade would insist that their apprentices should possess a good preliminary education the matter would be quickly righted; but they don't. Druggists hire the cheapest boy who comes along, and when the boy gets to be fifteen or sixteen years of age he makes up his mind that he wants to be a druggist, and he generally succeeds in a very few years in passing the board examination and receiving his certificate. How he does it, is often a matter of great wonder. He certainly is not entitled to it by reason of his possession of a satisfactory amount and quality of general or professional education.

Mr. Bodemann's criticism of the custom of starting young men in business under a heavy load of debt is not half caustic enough. Credit is a good thing, but it must not be abused, and unquestionably credit is terribly abused in this country. The liberal and careless extension of credit to merchants in all lines of business is directly responsible for the financial panics and stringencies which the country periodically suffers. A material proportion, far too large, of retail druggists is "owned by the jobbers." The druggist thus situated is virtually a slave, his nose is kept to the grindstone all the time, and whatever of ambition and manliness he may have started out with very soon becomes lessened, perhaps destroyed. A combination of incompetence and debt is an influence which very quickly kills good impulses, tarnishes principles, and tempts to the commission of acts and the adoption of a policy which cannot but work harm in all its effects. Mr. Bodemann rightly says that "practice at the bar" is one of these bad effects. While not altogether in accord with the virile expressions he employs, we can in all earnestness recommend to readers the very careful and thoughtful consideration of the questions which he so emphatically brings to notice. They are worthy of this thought and consideration.

Manufacturers' Rights in Formulas and Processes.

Some time ago we reported the decision of the Supreme Court of Michigan in the case of the O. & W. Thum Company, manufacturers of fly-paper, against a former employee, who had threatened to impart to others the information he had acquired while in their employ. The principle established in this decision was to the effect that formulas and methods, the products of the invention and labor of proprietors and inventors of specialties, are considered by the courts as property, with rights inviolable, and that employees who are taught and learn the process of manufacture and the composition of the product, are not free to part with such information to others for a consideration, nor even to engage in the manufacture of such specialties on their own account. The principles involved bear a most important relation to the rights

of manufacturers, and that they are in accordance with both law and justice is again affirmed in a decision recently rendered by the Supreme Court of Pennsylvania, in a suit where an employee who had been discharged from the establishment of certain manufacturers of carpets, attempted to establish his personal right to the recipes of the firm on the ground that they were the results of his own skill and labor, and therefore belonged exclusively to him. In defense of his claim, he alleged that such was the custom in the industry in which he was engaged. The manufacturers resisted the claim, the case being decided by the highest tribunal in the State. The principles upon which the decision rested are indicated in the following extracts:

It is one of the requisites of a good custom that it must be reasonable. Another is that it must not be contrary to law. The custom sought to be set up here was an unreasonable one. The color-mixer, like the designer and the weaver, is employed because of his supposed ability to serve his employer in the particular line of labor which he is expected to follow. . . . The services of each and all of these mechanics are requisite to the production of carpets. . . .

If a color-mixer could at his pleasure carry off recipes and color-books from his employer's factory, and refuse to permit their further use except upon his own terms, it would be in his power to inflict enormous loss on the manufacturer at any moment, and not merely to disturb, but to destroy his business. Such a custom would not be reasonable, and could not be sustained. But it is against the law. The courts of the United States, of this State (Pennsylvania), and of all the States in the Union, recognize the rule laid down. . . . that "the designs and recipes so made for the employer are, as between his employee and himself, his, for the purpose of his own manufacturing business. Even if his employee had obtained letters patent for his formula, protecting himself thereby against the public, still the employer's right to continue its use in his own business would be protected by the United States courts."

Foreign Trade of the Philippines.

From mere spots on the map the Philippine Islands have within two months grown to be familiar locations to the average American, and anxiety over the military situation has given way to a desire to know what our strange capture is worth. The Bureau of Statistics of the Treasury Department evidently anticipated the inevitable when its recent issue of the "Summary of Finance and Commerce" was made to contain answers to questions which many are asking about the trade of those islands.

The imports into the United States are given for five years, 1893 to 1897, inclusive, and are made up chiefly of sugar, textile grasses, hides, oils and manufactures of straw, and nearly all of these articles show a steady decrease, the total imports in 1893 amounting to \$9,159,857, while those of 1897 amounted to \$4,383.74.

Our exports to the Philippines during the same period consisted of breadstuffs, vehicles, chemicals, drugs, etc., cotton goods, iron and steel goods, mineral oils, varnish, etc. The same decline is noticeable in the amount of business done, the exports of 1893 amounting to \$154,378, while those of 1897 amounted to \$94,597. The principal decline is in mineral oils, while the articles listed as chemicals, drugs, dyes and medicines show the following values during the five years named: \$1,667 in 1893, \$1,453 in 1894, \$320 in 1895, \$3,390 in 1896 and \$3,316 in 1897.

The possibilities of trade, however, are best shown by that done by the Philippines with Spain and other foreign countries. Thus, for a period of five years, nearly corresponding with that for which figures have been given, imports into Spain from the Philippines averaged about 20,000,000 pesetas (approximating \$4,000,000), but even this trade shows a slight decline, the figures for 1892 being 22,911,117 pesetas, and

those for 1896, 22,519,904. In these imports there are several items which do not show in the imports to the United States, viz., indigo, gum mastic, tobacco leaf, coffee, cocoa, etc. In 1897 the United States received 10 per cent. of the sugar exported from the Philippines, 48 per cent. of the Manila hemp, and one and one-half per cent. of the cigars.

The exports from Spain to the Philippines during the years 1892-96 showed a decided increase, the figures for the first year named being 18,893,616 pesetas, and for the last-named 38,357,757 pesetas. Taking the year 1896, the big items are: Cotton fabrics, 25,470,731 pesetas; paper, 1,571,302 pesetas; leather, 1,012,898 pesetas; and far from least is 335,420 pesetas for playing cards, and 639,453 pesetas for umbrellas. Chemicals, medicines, etc., show a value of 158,152 pesetas; paints and colors, 100,235, and perfumery, 145,056.

Curacao or Curacoo.

Erudition has its claims, but custom is imperious, says the New York Sun in commenting upon the spelling of Curacao, the Dutch West Indian island so familiar to pharmacists in connection with aloes and Citrus Aurantium curassaviensis, the orange furnishing the distinguishing ingredient in the liqueur which takes its name from the island. The Sun confirms the soundness of the correspondent's information and timely import, but it is not prepared to admit the expediency of adopting for the uses of a daily journal a method of spelling which does not conform to the universally accepted pronunciation of English-speaking people. The correspondence exciting these remarks is to the following effect:

The authorities and the best usage prescribe that the name of the Dutch island be spelled Curacao, and not Curacoo.

Dr. Egli, the leading authority on geographical nomenclature, recognizes only the termination "ao," following the Portuguese map of 1527, on which the name first appeared. All the leading Continental (Europe) geographers follow him, as witness the usage in the Stieler and Andree atlases in Germany, the Vidal Atlas in France, and the Royal Geographical Society and Statesman's Year Book in England.

In December, 1890, our Board on Geographical Names adopted "ao," making the other spelling as "the discarded form." Curacao appears in all our Government publications, e. g., Congressional Directory, p. 272.

Johnson's Cyclopædia gives "ao or oa," and the Century Dictionary of Names, "ao or oa."

Of eleven early maps giving the name, seven have "ao"—Ortellus (1557), Sanson (1650), De Vaugody (1750), De La Marche (1767), D'Anville (1748), Bonne (1781) and Mannert (1803).

Three have "oa"—Speed (1626), Popple (1733), Arrowsmith (1832), Delisle (1703) has Curacou."

The preponderance of authority, especially of scientific and technical works, is in favor of "ao," but there is not a little on the other side. Therefore, take your choice.

A Needed Reform.

The Committee on Scientific Papers of the A. Ph. A. is out with a circular letter which presents several most excellent requests and suggestions. Authors of papers are asked to submit abstracts thereof, and to state the length of time they will require to satisfactorily present their subjects. They are farther especially urged to consider such presentation, whenever possible, as an introduction to more general discussion,

and to omit unessential details in the oral report, in order that greater emphasis may be laid on the outline of the work accomplished, and that, if possible, liberal discussion may be evoked. To this end authors are requested to mention on their abstracts the names of members of the association who are sufficiently familiar with their work to participate in the discussion which may follow the reading of the papers. This last request is a particularly practical one, and if acted upon will add much to the interest and profit of the sessions of the section on scientific papers. The ordinary discussion of a paper is a mournful proceeding. It is participated in by those who, as a rule, have but superficial or no practical knowledge of the subject, and who frequently make statements and ask questions calculated to make even angels weep. Possibly these people are mainly actuated by the laudable desire to make the proceedings lively, "to keep the thing a-go-in," but the effect is quite otherwise. Those who really are posted keep quiet, from their dislike, perhaps, to making the others ridiculous by a show of superior knowledge, or they may be too modest to speak without definite solicitation. But whatever may be the causes and reasons for existing conditions, it is very desirable that they be amended, and the committee's proposition is a most laudable one. When a paper is read the presiding officer will know upon whom to call for remarks which will add to the knowledge of the subject, will possibly answer the problems or questions presented by the author, which, in any case, will at least be germane. We shall expect lively and profitable sessions of the section hereafter.

Outings for Drug Clerks.

The Alumni Association of the New York College of Pharmacy held its annual outing last week, and all who participated enjoyed the occasion so greatly that they wished the outings, instead of coming once every Summer, might be held every month during warm weather. These facts make the present an opportune moment for pointing out the advisability of pharmacists and drug clerks indulging in this kind of recreation. There is no need to tell druggists or their clerks how hard they have to work, or how busy they are kept, or how necessary is an occasional rest to keep their health good and their tempers sweet. But it can do no harm to say that one of the best forms of rest for them is a change of scene and air, as well as of occupation—a jaunt to fresh woods and pastures new, or to the sea's resounding shore. After the Winter's confinement within city walls the first breath of clear clean country air is an inspiration. It invigorates; it renews the vitality of your hard-working city dweller as nothing else can. And the more he gets of it the better it is for him. After a day in the country or on the water drug clerks, as well as other mortals, will do their work better and with more contentment. The wise employer should favor a periodical taste of such recreation as good business policy. Give the clerks a day in the country as frequently as possible. One outing should not make a Summer. Take all the outings you can during the hot days. Employers, go with your clerks when you can, or go yourselves one day and let them go the next. Get fresh air, limber up your joints and tighten up your muscles, and all the doubts you ever had about the beauty of the world and the sweetness of life will sneak off like the storied Arabs who fold their tents and silently steal away.

The druggists of Camden, N. J., will close their stores every Sunday afternoon during the Summer from 1 to 6 o'clock. Why not make it all day?

From old, sober, staid Connecticut and somewhat lively and exuberant Illinois come reports of like general nature with reference to the enforcement of the so-called "blue laws," regarding the transaction of business on Sunday. In Connecticut a druggist was arrested for selling some ice cream on Sunday. This resulted from a complaint by some fruit dealers who had been compelled to close up on that day, and who wanted to get even. It is all right, though, on the principle that "what is sauce for the goose is sauce for the gander." In an Illinois town not a store or shop was allowed to be open. You could not buy a cigar or a newspaper, or get your boots blacked. Some of those affected by this rigid enforcement of the Sunday closing law waxed sarcastic, and placarded their places of business with announcements setting forth their opinions of the powers that be. One druggist notified the public that if they should happen to get sick on Sunday and need medicine, they would act wisely by notifying the undertaker, as by the time Monday came around the druggist would be of no assistance. The reformers themselves got more reform than they really desired, and now an attempt is to be made to sit upon two stools without falling to the ground, to please the radicals and the liberals. This has never been done yet in the history of the world, but it may succeed in Danville, Ill., the town to which reference is here made.

It is with considerable gratification that we read of the vigorous campaign which the Dairy and Food Commissioner of Michigan has inaugurated against the disreputable adulterated syrups and artificial extracts which are used in the cheaper kinds of beverages sold during the Summer, particularly by a certain class of merchants and street vendors. It is a difficult task to trace these articles to their manufacturers, but as they are distinctly dangerous products, everyone who handles them is logically and justly subject to the penalty therefor. The moral effect of the prosecution of a retail druggist, say, for poisoning his patrons with these rank artificial extracts, would be very healthful. We may feel sorry for the individual, if he be really innocent of intent to defraud and ignorant of the nature of the stuff he handles, but ignorance is no excuse, and often constitutes direct criminality, as in this case. Talk about the poisonous effect of fusel oil in whiskey, authorities differ on this point, but there is no difference of opinion and no doubt whatever that the artificial fruit essences are, most of them, directly and immediately poisonous, and that, too, in not very large quantities. It would not be a bad idea to apply the restrictions of the poison law to the sale of such articles.

For some years in the city of Buffalo there has been an ordinance, secured by the endeavor of the Board of Health, prohibiting the sale of infants' nursing-bottles with long rubber tubes. Recently the health officer learned that this ordinance was being violated by the druggists, and so he instituted a thorough visitation and inspection of drug stores, with the result that a large number of warrants against druggists were sworn out. The most prominent druggists in the city got caught in the net, and will have to walk up and pay their fines for the offense, which fine ranges from \$5 to \$250. It is dangerous to tamper with the health of the little suckers in Buffalo.

The history of the great Procter & Gamble Company, of Ohio, offers material for many a text to political economists, philanthropists, and especially to those interested in the co-operative question. Conducted upon the co-operative plan this enterprise has

not only returned a big profit to its principal and responsible owners, but has furnished sufficient of reward to every employee to stimulate to best effort and to remunerative labors. From a recent announcement it is learned that this company has just declared a special 5 per cent. employees' dividend, due to the increased sales and faithfulness of the workmen during the last two years, and, further than this, there has also been declared the twenty-second semi-annual dividend of 12 per cent. to the employees. There is a hint in this to every large industrial enterprise.

HOW THE BRAIN WORKS.

A committee of British physicians, acting jointly, has for some years been giving particular attention to this topic, and their researches, though not yet altogether complete, already show some very interesting results, which, taken together with those of investigators on the Continent, let us see a long way into the intricacies of the brain.

It has shown unequivocally, for example, that a brain cell, which is the really important part of the brain, actually loses part of its substance during action. The brain cells of persons and of animals that have died during a period of great exhaustion from overexertion are found to be greatly changed from the condition of the normal cell during times of health and vigor. The cell of the exhausted brain, instead of being plump and full of nervous matter, is found to be hollowed out or "vacuolated," a cavity within its substance having formed and being filled with water. This means that a part of the cell substance has been actually consumed during the time of brain activity, precisely as coal is consumed when one gets heat from a furnace.

It is found, further, that if an animal whose brain cells are thus exhausted is permitted to rest and to sleep, its cells rapidly recuperate, new material being supplied from the blood until the vacuolation has disappeared and the cell is practically as good as new again. This explains why sleep is necessary to our existence. During waking hours our brains are literally worn away, and sleep is the state during which the repair shops of the brain make good the damage of the waking hours. Thus the brain of a person who suffers from insomnia is in the condition of a locomotive which is run night and day without going to the repair shops. Disaster must ultimately result.

It is not sleep alone, however, that rests the brain cell, though sleep is absolutely essential to recuperation of the brain as a whole. But not all parts of the brain are involved in any one kind of mental effort. The blood supply of the brain is so arranged that, by expansion or contraction of different arteries, parts of the brain may be flushed with blood and other parts dammed off, so to speak, somewhat as the various currents of an irrigated field are regulated by the gardener. And as a rapid flow of blood is essential to great mental activity, this means that one part of the brain may be very actively at work while another part is resting and recuperating.

Thus it is that a person suffering from brain fatigue may leave his desk and go out into the fields, or on the highways with a bicycle, and by diverting his mind give the overworked cells a chance to rest and recuperate.

But it must not be overlooked that such exercise involves other brain cells, which in turn become exhausted; and that in the end, for the recuperation of the brain as a whole, sleep is absolutely essential. No recreation, no medicine, no stimulant, will take its place. The man who does not give himself sufficient hours of sleep, or who is unable to sleep when he makes the effort, is literally burning away his brain substance, and can no more keep on indefinitely in this way than a locomotive can run on indefinitely without getting fresh supplies of fuel. —San Francisco Call.

TO PREVENT RUSTING OF SCREWS.—In machinery that is exposed to heat or moist air, the screws soon become rusty and flinty fixed, even after application of oil, making it very troublesome to take the machine to pieces. If, however, the screws are coated with a thin mixture of graphite and oil before insertion, they can easily be removed again, even after years. (Ap. Zig.).

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S.,
M.D., Ph.G.
Virgil Coblenz, A.M., Ph.
M., Ph.D., F.C.S.
Wilber G. Compher, A.M.,
M.D.
Albert E. Ebert, Ph.M.,
Ph.D.
James M. Good, Ph.G.,
M.D.
Arthur L. Green, M.D.,
Ph.D., Ph.C.
Charles F. Heebner, Ph.M.,
B., Ph.G.
George B. Kauffman, B.Sc.,
Phar.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G.,
Ph.D.
Edward Kremers, Ph.G.,
Ph.D.

John Uri Lloyd, Ph.M.,
Ph.D.
Oscar Oldberg, Phar.D.
Charles W. Parsons, Ph.C.
Edgar L. Patch, Ph.G.
George F. Payne, Ph.G.,
M.D.
T. D. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M.,
M.D.
Henry H. Rusby, M. D.
L. E. Sayre, B.S., Ph.M.
Wilbur L. Scoville, Ph.G.
William Simon, Ph.D.,
M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college, for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 27, 1898; the second term began February 17, 1898, and will end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum, and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE NO. 79.

Pharmaceutical Processes.

Processes of Liquefaction and Solidification.

PROCESSES OF LIQUEFACTION.

By a process of liquefaction is meant any process the effect of which is to cause a solid or gaseous body to assume or pass into the liquid state. The two chief methods by means of which liquefaction is produced are Fusion and Solution.

The usual effect of liquefaction, in addition to the special effects hereafter to be considered, is to facilitate chemical action. This is no doubt because the molecules of the several reacting elements or compounds are then most free to move about and to leave one and enter into new combinations.

Fusion.—Fusion or melting is the liquefaction of a solid by the application of heat. As previously mentioned under pharmaceutical physics, the difference between solids, liquids, and gases results from the different degrees of mobility of the ultimate particles of matter of which the bodies are composed, the degree of mobility and range of motion depending upon the amount of heat energy which is present.

In solid bodies the range of the molecules is restricted within certain very narrow limits, thus enabling the mass to preserve a constant external form; in liquids the molecules are free to move about and among each other, thus permitting the liquid to assume the shape of the vessel in which it is placed; while in gases, the molecules are not only free to move about and among each other, but are endowed with a certain amount of repulsive force which would cause them to fly off into space, if not restrained by the walls of the containing vessel.

The ordinary objects of fusion in pharmaceutical operations are three: (1) To enable a chemical reaction to take place which would not occur between the substances while in the solid state, as in the preparation of sulfur iodide. (2) To permit the perfect admixture of certain substances which could not be so accomplished with solids, as in the preparation of some of the official ointments and cerates. (3) To permit the purification of some substances by melting and straining, as in the preparation of purified aloes.

The degree of heat employed to effect the fusion, and the manner of its application depend upon the nature of the substances operated upon, and best receive consideration in connection with the substances themselves.

LIQUEFACTION BY SOLUTION.

Solutions.—A solution is, in the most general sense, a homogeneous mixture of dissimilar substances. This would make the term solution include all mixtures of every description, whether solid, liquid or gaseous, provided the admixture was homogeneous, i. e., provided the several constituents were equally distributed through each portion of the mass. While the foregoing may be a strictly scientific definition of the term, it is not the one commonly understood in pharmacy, and will not receive more than passing attention.

In the pharmaceutical sense, a solution is the liquid which results when a solid or gas liquefies and disappears into a liquid known as a solvent, or when two liquids form a permanent and homogeneous mixture with each other. In the same class may be included the liquids formed by mixing certain solid substances together. Any process whereby any of these liquid mixtures is produced is a process of solution.

In a solution the solid, gas, or dissolved liquid disappears as such, and becomes equally diffused throughout the whole body of the solvent, imparting to the new mixture properties not previously possessed by the solvent alone.

When the solvent and the dissolved substance are both liquids, the former term is commonly applied to the liquid which is in excess.

It is customary in works on pharmacy to consider solution as being of two kinds, Mechanical or Simple Solution, and Chemical Solution. By simple or mechanical solution is meant one which is formed without any apparent chemical reaction accompanying the operation, as in the dissolving of common salt in water. By chemical solution on the other hand would be meant one which is accompanied by a distinct chemical action resulting in the destruction of old and the formation of new combinations, as when iron wire is converted to ferrous chloride by hydrochloric acid and the resulting compound dissolves in the water which must be present in order that the reaction may take place.

It is doubtful whether this distinction between simple and chemical solution is either necessary or useful. In the so-called chemical solution, the chemical reaction and the resulting solution of the substance formed thereby are separate and distinct steps in the process, while in the

unlikely that even in simple solutions some weak kind of union takes place between the solvent and the substance, but which is readily broken up when the liquid is evaporated.

Effect of Solution.—The usual effect of a solid when dissolved is to increase the density of the solution above that of the solvent, because most soluble solid substances have a greater specific gravity than their common solvents. On the other hand, the usual effect of a dissolved gas is to decrease the density of the liquid, since gases have lower specific gravities than liquids. When both substances are liquids, the specific gravity of the mixture will be the mean of their separate specific gravities, unless contraction or expansion takes place.

If the dissolved substance is colored or possesses an odor it imparts its color or odor to the solution, unless some reaction occurs whereby these properties are destroyed.

Effect of Heat on the Solubility of Solids.—The solubility of solid substances varies from those which are soluble in less than their own weight of water to those which require many thousand times their weight for solution. Few substances are absolutely insoluble, though ordinarily so-called because their solubility is so slight as not to be detected in ordinary operations. Even the glass and porcelain vessels of the analyst are so acted upon by the solutions for which they are used that in accurate work a separate weighing is required for each operation.

Generally the solubility of a solid substance increases rapidly with the temperature of the solvent. For example, the solubility of potassium bitartrate varies from one part in two hundred parts of cold water to one part in about seventeen of hot water. This increase of solubility with increase of temperature is not universally the case, however, as some of the calcium and magnesium compounds are less soluble in hot than in cold water, and consequently precipitate when their solutions are heated.

Solubility of Gases.—The solubility of gases in liquids depends upon the affinity between the gas and the solvent, the pressure to which it is subjected, and the temperature.

The solubility of such gases as nitrogen and oxygen in water, for which they have small affinity, is very slight, while carbon dioxide, hydrogen sulfide, and ammonia, which form more or less definite combinations with the water molecules, are quite freely soluble.

The solubility varies also according to the pressure as expressed in the law of Henry and Dalton, which is, *That at constant temperature, the solubility of a gas in a liquid varies directly as the pressure to which it is subjected.* Doubling the pressure will double the amount of gas dissolved, trebling the pressure trebles the amount dissolved, and so on, the temperature being supposed to remain the same in each case.

Gases follow an opposite rule from solids and liquids as regards the effect of heat upon their solubility, and are less soluble in hot than in cold liquids. This is what would naturally be expected from the nature of the gaseous state, which is presumed to be due to the molecules being kept apart by means of heat. To increase the temperature is to still further increase the range of molecular motion and likewise the repulsion between the particles of the gas and the particles of the solvent. Water at 0° C. dissolves or absorbs about 1,000 times its own volume of ammonia gas and gives it up completely at the boiling point.

Solution of One Liquid in Another.—Many cases which are ordinarily looked upon as simple admixture of liquids may be regarded as the solution of either liquid in the other. For example, when a small quantity of ether is added to a large quantity of water, or a small quantity of water to a large quantity of ether, the liquid added in the smaller quantity disappears and is said to be dissolved by the other. In this and in many similar cases the term solvent is applied to the liquid which is present in the largest quantity.

Liquids follow the rule of solids as regards the effect of temperature on solubility, being more soluble in hot than in cold liquids, except when the temperature of the sol-

vent is above the boiling point of the dissolved liquid, when it is, of course, less soluble.

In the case of such liquids as water and alcohol, water and glycerin, etc., which can be mixed in any proportion, either liquid may be looked upon as the solvent.

Liquefaction by the Mixing of Solids. **Eutexia.**—Certain solids, chiefly organic compounds, liquefy when shaken or rubbed together. The name eutexia has been proposed for this phenomenon, which is best explained by presuming that the several solids react upon each other to produce new compounds which have lower fusing points than their constituents. Ice and salt, camphor and chloral, phenol and thymol, are examples of eutectic mixtures.

Solvents.—The solvent powers of liquids vary greatly. The liquid which possesses the widest range of solvent powers is probably water, which dissolves nearly all chemical substances to a greater or less extent, though in some cases the quantity dissolved may be too small to be detected by means of the ordinary tests.

In addition to water the principal solvents used in pharmacy are alcohol, glycerin, ether, and the volatile and fixed oils.

As a general rule it may be stated that the solvent powers of a liquid increase with the chemical similarity between the solvent and the dissolved substance. Thus the best solvents of the solid hydrocarbons and their derivatives are the liquid hydrocarbons and their derivatives; for sulfur, carbon disulfide, etc.

Water dissolves very many mineral salts, and of the constituents of plants, alkaloidal salts, vegetable acids, gums, sugars, glucosides, etc. It is not a good solvent for alkalis in the free state, nor does it dissolve resins or fixed oils, and dissolves the volatile oils only slightly.

Alcohol dissolves alkaloids, the resins, volatile and some fixed oils, the bitter principles of plants, etc., but not gums.

Chloroform and ether resemble each other very much in their solvent powers. They dissolve most alkaloids, but usually not their salts, resins, both fixed and volatile oils, many organic substances, etc.

Glycerin dissolves tannin and other bitter principles of plants, borax and boric acid, some metallic salts, etc.

Volatile oils dissolve resins, fats, waxes, the fixed oils, etc. The fixed oils have somewhat similar solvent properties.

Saturated Solutions.—A solution is said to be saturated when it has dissolved all of a given substance which it is capable of taking up at that temperature. It follows that the saturation point varies with the temperature, generally rising, with the exception of the cases which have been previously spoken of. Potassium bitartrate, which requires 201 parts of cold water for its solution, dissolves in about 17 parts of water at the boiling point.

As an example of the opposite kind, may be taken calcium oxide, or lime, which is soluble in 750 parts of water at 15° C., but requires 1300 parts of water at the boiling point for solution. Consequently, when a solution of lime is heated, a portion of the compound will separate out, and redissolve on cooling.

A solution which is saturated with one substance is not necessarily saturated towards other substances, i. e., its solvent powers for other substances may remain undiminished, or be only slightly lessened by the substance already in solution. For example, a solution which is already saturated with common salt, will still dissolve considerable quantities of many other salts.

In some instances, the amount of a salt which a saturated solution will dissolve exceeds that which it would have dissolved by the solvent alone. For example, borax, which is soluble in 16 parts of cold water and cream of tartar, which requires 20 parts of cold water for solution, when mixed together will dissolve in their own weight of water. This is to be explained by the fact that the two salts combine to form a double salt or a boro-tartrate, which is more soluble than either of its constituents.

Other examples of increase in solubility by admixture are probably to be explained in a similar manner.

Effect of Solution on Boiling and Freezing Points of Liquids.—The boiling point of a liquid is raised and its freezing point is lowered by dissolving a salt in it. The effect is proportional to the amount of substance dissolved.

When liquids which mix readily with each other, i. e., which are mutually soluble, as water and alcohol, are united, the boiling point of the mixture will lie between the boiling points of its constituents. If the two liquids are mutually insoluble, as water and carbon disulfide, the boiling point of the mixture will lie below the boiling point of either constituent.

Liquefaction of Gases and Vapors.—All known gases and vapors may be caused to assume the liquid state when subjected to the proper conditions of pressure and temperature. As previously explained, the molecules of a gas are to be considered as being kept apart by the heat energy which they possess. The withdrawal of the heat or the application of pressure tends to bring the molecules into the closer relation which they occupy in the liquid state. The methods of reducing gases to liquids, then, consist in cooling by suitable means and by the application of great pressure.

From the researches of Andrews, it has been determined that for every gas there is a particular temperature which has been denominated the "critical point," above which the gas will not liquefy, no matter how great the pressure to which it may be subjected.

The pharmacist is, of course, never called upon to perform such operations as the liquefaction of gases by pressure, but since the use of liquefied and compressed gases, as carbon dioxide, or "liquid carbonic acid," is constantly increasing, it is of importance that he should know something of their properties and mode of manufacture.

The principal point to be observed in the preservation of liquefied and compressed gases, as in the case of cylinders of liquefied carbon dioxide, fountains and siphons of carbonated waters, and the official waters of ammonia, is to avoid subjecting their containers to sudden jars or shocks, or to a sudden or material rise in temperature. Serious explosions have been known to result from leaving vessels of this kind exposed to the heat of the sun's rays.

PROCESS OF SOLIDIFICATION.

These include all of the pharmaceutical operations whereby a liquid or vapor is caused to assume the solid condition. Some of these are of a mechanical and others of a chemical nature. The three principal methods which will receive attention are Refrigeration, Evaporation and Precipitation.

Solidification by Refrigeration.—Solidification by refrigeration is the familiar act of solidification which takes place on the cooling of a fused solid or the freezing of a liquid, as water.

Ordinarily the freezing or solidifying point of a substance is the same as its melting point. In some special cases, however, solids when once fused do not at once re-assume the solid state when again cooled to their fusing point, probably from the fact that the molecules are not able to immediately regain their former positions. As an example of this kind Cacao Butter may be mentioned, which melts at a temperature of 30 to 35° C., but does not re-congeal until cooled down to about 20° C.

Solidification by Evaporation.—Solidification by evaporation includes all of the cases where a solid residue remains from the evaporation of a solvent, as in the preparation of the solid extracts, etc.

Evaporation may be accomplished either by the direct application of artificial heat, or by exposing the liquid to the natural temperature of the atmosphere. When allowed to proceed in the last named manner the process is denominated *spontaneous evaporation*.

In the cases in which artificial heat is employed, the degree of heat and the manner of its application depend entirely upon the nature of the substance which is the subject of the operation. For this reason the cases in which solidification by evaporation is required are best considered under the heads of the preparations in which it is required. The general principles of the subject have been already discussed in the lecture on the application of heat.

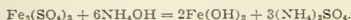
Solidification by Precipitation.—The formation of a solid by precipitation is where a solid is thrown out from solution in one liquid by the addition of another called the precipi-

tant, and has already been briefly alluded to under the subject of comminution.

There are two cases of precipitation as follows: One is where a dissolved substance is thrown out of solution by the addition of another in which it is insoluble, as in the preparation of the official resins. In these a concentrated alcoholic tincture is poured gradually into a large quantity of water. The resin being insoluble in water is precipitated as a fine powder and is separated by straining or decanting the liquid. In like manner the gums, the metallic sulfates, and some other substances may be precipitated from their aqueous solutions by the admixture with alcohol.

The second class of precipitations is where a solid substance is formed by a chemical reaction resulting from the mixture of solutions which contain constituents capable of combining to form a compound insoluble in the liquid present.

This is the kind of precipitation most frequently occurring in pharmaceutical processes. A familiar example is seen in the preparation of the official ferric hydrate by the addition of ammonium hydrate to a solution of a ferric salt, as represented in the following equation:



The iron and hydroxyl combine to form the insoluble ferric hydrate, while the remaining elements form soluble ammonium sulfate which remains in solution.

Usually, as in the above example, a soluble compound is formed at the same time, but this is not necessarily the case. Instances may occur in which all of the compounds formed may be insoluble in the liquid present, and all precipitate, leaving nothing but the solvent behind.

Character of the Precipitate.—The character of the precipitate, as regards its fineness, density, etc., depends largely upon the temperature and concentration of the solutions at the moment of admixture. As a rule, high temperatures and concentration favor the production of fine grained and dense precipitates, while low temperatures and dilution favor the production of precipitates which are coarse grained and light. When the solutions are cool and dilute, the reaction takes place slowly, thus giving time for the formation of particles of larger size. Precipitates which are formed in this manner, are frequently granular or crystalline.

Coarse precipitates are less easily washed than fine, since the larger particles retain contaminating substances within their interior. On the other hand, very fine precipitates are sometimes troublesome to wash because of the facility with which they may pass through a filter. The consolidation of fine precipitates into larger particles is sometimes promoted by gentle stirring or by heating moderately. Stirring and heating also favor their subsidence to the bottom of the vessel in which they are formed.

Precipitating Vessels.—Precipitations are most convenient where they were contained in the supernatant liquid. This contracted tops, as chemical flasks or the conical glasses known as "precipitating jars." (Fig. 39.) These vessels readily permit the separation of the supernatant liquid by decantation, the precipitate being caught by the narrowing sides of the vessel as it rolls forward toward the mouth.

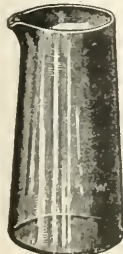


Fig. 39.—Precipitating Jar.

Washing Precipitates.—In certain cases, the sole object of the precipitation is to obtain the soluble products of the reaction. In such cases the precipitate is to be regarded simply as an incidental or by-product which is filtered off and rejected. In the majority of cases, however, the precipitate itself is the product desired, and must be washed free from the soluble matters which were contained in the supernatant liquid. This may be accomplished by decantation, filtration, or straining, which are special processes of separation and will receive special treatment under their respective titles. When the precipitate is coarse and settles readily it is best washed by decantation; if fine grained, by filtration; and if a gelatinous magna, by straining or colation.

Precipitations Caused by Heat, Etc.—Another class of precipitations are those due to molecular changes induced by the action of heat, or which gradually take place on long standing. An example of the first kind is where albumin in solution is converted into the insoluble variety by boiling and precipitated.

An example of the second kind is found in the gradual production and separation of insoluble compounds from organic matters in solution, as in the precipitates so frequently noticed in the liquid preparations of organic drugs, as tinctures, fluid extracts, etc.

LECTURE No. 80.

Pharmaceutical Processes.

Processes Involving Changes of Relation.

By Changes of Relation are meant all those changes which result in the breaking up of old or the formation of new associations or combinations.

Many natural or commercial pharmaceutical materials consist of several distinct substances mechanically or chemically combined, from which it is necessary to free them in order to render them fit for use in medicine and pharmacy. To accomplish this there are provided certain Processes of Separation. Again it is frequently desirable to unite several distinct substances which do not naturally exist in combination. For this purpose there are necessary certain Processes of Combination.

These processes of separation and combination may be either physical or chemical, but are principally the former.

PHYSICAL SEPARATIONS.

Under this title are included all of the processes whereby the separation of unlike substances is accomplished by methods which are purely mechanical or physical.

The principal physical separations may be enumerated as follows:

- Separations by Pressure.
- Separations by Centrifugal Force.
- Separations by Sifting, Straining and Filtering.
- Separations by Dialysis.
- Separations by the Use of Heat.
- Separations by the Use of Solvents.

In some instances two or more of the above may be combined in the same operation, as for example, in the application of heat in expression, filtration, etc.

SEPARATION BY PRESSURE.

Expression.—Expression is a general name applied to the several processes whereby liquids are separated from their admixture with solid materials by the application of pressure. The instrument by means of which expression is accomplished is called a press.

The object of the expression may be to obtain the solid residue, but more frequently it is the expressed liquid which is desired. This may consist of the juice of fruits or fleshy vegetable substances, or fixed or volatile oils, or the liquids which saturate the solid residues left from the processes of maceration, digestion, etc.

It generally occurs that some solid matters in the form of fine powder are carried along with the expressed liquid, and are afterwards separated by filtration or by decantation.

Hand Expression.—This is the simplest form of expression, and was doubtless one of the first processes invented by the primitive pharmacist. The material to be expressed is placed in a bag of coarse material, or in the center of a square cloth, the corners of which are gathered together so as to enclose the material on all sides. The bag or folded cloth being firmly grasped with one hand near the top, with the other hand it is twisted upon itself with gradually increasing pressure, the liquid portions escaping through the meshes of the cloth.

Another form of the twist press intended for large operations consists essentially of a large conical coarse bag, with the wider end down, and fastened at the top and bottom to metallic rings.

The Screw Press.—This is the form of press familiar to dispensing pharmacy in the common tincture press, formerly much used to express tinctures from their *marcs*, as

the solid residues are called, when their preparation by maceration was in vogue.

In this style of press a plunger is carried at the end of a long screw with a flat thread, which passes through a nut fixed in a stout frame and is operated by means of a two-handled lever. (Fig. 40.) By the revolution of the screw the plunger is thrust with great force against the material to be expressed, which is contained in a perforated metallic cylinder.

Sometimes the material is simply wrapped in a muslin cloth and enclosed in a cylinder with perforated sides, the object of the cylinder being to prevent the rupture of the cloth.

In large presses of this kind the material may be enclosed in bags of stout canvas, or of hair cloth, or other stout but permeable material.

Numerous other forms of the screw press are manufactured and used for special purposes, but the same general principles are applied in the construction of all.

The Hydraulic or Hydrostatic Press.—This press depends for its efficiency upon the principle of hydrostatics that pressure applied at one point in a fluid is transmitted equally in all directions without diminution.

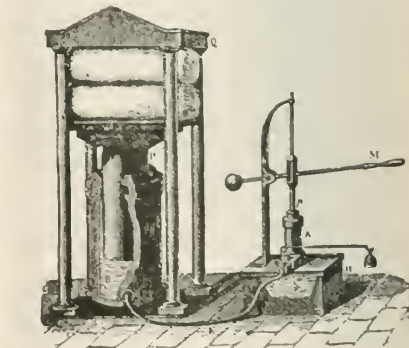


Fig. 41.—Hydraulic Press.

In its simplest form the hydrostatic press consists of two cylinders of unequal diameter, each containing a piston which passes through a water-tight collar. By means of the piston in the smaller cylinder water is pumped through a connecting pipe into the larger cylinder, there-

by forcing the piston of the latter upward. The upper end of the larger piston carries a broad flat plate upon which the material to be expressed is placed and is compressed against a frame above. (Fig. 41.)

The force exerted by the large piston will be as much greater than applied to the less as its area is greater than the area of the less. For example, if the area of the one be one hundred times that of the other, and the pressure upon the smaller is ten pounds, then the pressure exerted by the larger will be ten times as great, or one thousand pounds. There is, of course, no real increase in energy, the gain in pressure being due to the smaller distance through which the larger piston moves as compared with the other. Neglecting friction, the product of the distance moved by one piston by the pressure exerted upon or by it is equal to the product of the distance moved and the pressure exerted by the other.

Practically the theoretical results are never obtained, owing to losses of energy through friction of the pistons upon their collars, and in other ways.

Instead of water, other liquids may be used in the pistons, as glycerin, fixed oils, alcohol, etc., the only advantage gained by the substitution being that the latter liquids are not liable to freeze.

In a special form of the hydraulic press the smaller piston and the reservoir for the liquid are contained in the inside of the larger piston, thereby requiring less room.

Because of the great pressure which may be applied by means of this press, it is the one most frequently used in large manufacturing operations.

The Enterprise Press.—A novel hand press is that manufactured by the Enterprise Manufacturing Company. It is used without a press cloth and consists of a conical piece of tinned metal with a spiral groove running from the base to the apex, and enclosed in a metallic casing of similar shape. At the base of the cone-shaped case is a hopper through which the material to be subjected to expression enters the press. Here it falls into the grooves of the screw which is turned by a crank and is carried along toward the apex, the expressed liquid passing through holes at the bottom of the casing, while the dried marc is discharged at the extremity of the cone. (Fig. 42.)

The Enterprise Press is especially convenient for the expression of small quantities of berries and other soft fruits.

Expression with Heat.—In the expression of oils on the large scale an increased yield is sometimes obtained by the application of heat to the material at the time of expression. This is generally accomplished by having the press plates hollow and connected so as to receive live steam or hot water during the operation.

Oils expressed in this manner are, as a rule, more liable to become rancid and to contain acid principles derived from the seeds from which they are obtained than cold pressed oils.

Rules for Conducting Expression.—If the material to be subjected to expression contains tannin or free acids it should not be brought in contact with parts of the press which are constructed of iron. Preferably all metallic parts of the press liable to come in contact with the substance submitted to expression should be tinned.

The pressure should be gradually applied and constant. The immediate application of the full force of the machine not only subjects it to undue and unnecessary strain, but is also less efficient than a very gradual application of the force slowly increased from the beginning to the end of the operation.

If the material is contained in a perforated cylinder, it should be evenly packed. If it is contained in a press cloth, it should be so disposed as to exert an equal pressure upon all parts of the cloth.

In the use of the screw press it is preferable that the material be first enclosed in a press cloth before placing under the press.

SEPARATIONS BY CENTRIFUGAL FORCE.

These are separations accomplished by causing the vessel which contains the mixture of substances which it is desired to separate to revolve at a high rate of speed. The denser liquid, or the solid portions, are thrown by the action of centrifugal force to that portion of the vessel which describes the circumference of the largest circle.

In sugar manufacture a mixture of sugar crystals and uncrystallizable molasses is thrown into a rapidly revolving drum with perforated sides. The liquid escapes through the interstices of the cylinder, leaving the sugar crystals behind.

In creameries a similar use is made of the principle to separate cream from the heavier milk of which it forms a part. The separator consists of a metallic bowl-shaped vessel which revolves at a high rate of speed, the milk being thrown to the circumference, while the lighter cream escapes through another orifice at the center.

Small machines known as Centrifuges are used for the separation of sediments from urine for microscopic examination, and for the testing of milk. In one form of the apparatus known as the Babcock machine, from its inventor, Professor Babcock, small flasks with long, narrow, graduated necks are filled with a measured quantity of the milk and sulfuric acid and rapidly whirled for the requisite time. The acid causes the fat to separate from the milk, which, being the heavier, finds its way to the bottom of the flask, the cream rising into the graduated neck where it is read off.

A special form of centrifuge is manufactured by Bausch & Lomb, and is especially intended for the separation of urinary sediments, and of corpuscles from blood. (Fig. 43.)



Fig. 42.—Enterprise Press.

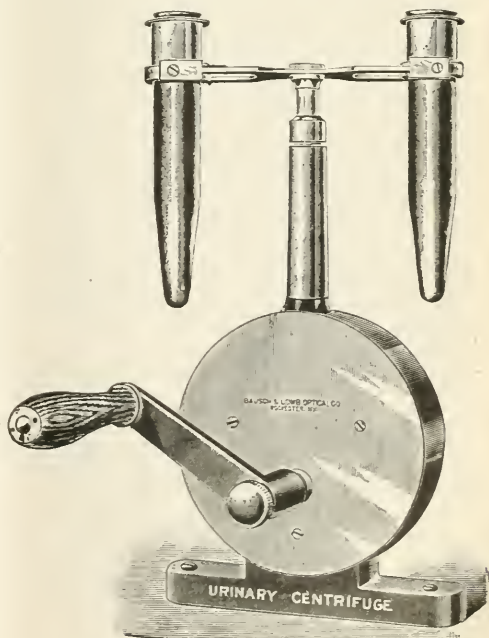


Fig. 43.—Centrifuge.

SIFTING, STRAINING AND FILTERING.

These three processes have this in common, that they are separations made by a medium permeable by some portions of the mixture of substances placed upon it, and not permeable by other portions.

Sifting differs from the other two processes by being applied to mixtures of solids of different degrees of fineness, while in the case of filtering and straining, at least one of the constituents of the mixture is a liquid.

Sifting.—Sifting is the separation of the coarser from the finer portions of a powder by agitating the mixture in a vessel called a sieve, the bottom of which is composed of a meshed material of a suitable degree of fineness, the coarser portions being retained on the sieve, while the finer portions pass through into a receptacle below.

As mentioned under comminution, the fineness of the powder is designated by numbers, indicating the number of holes or meshes to the linear inch of the sieve through which the powder will pass; thus a No. 80 powder is one which will just pass through a sieve of 80 meshes to the linear inch, or $80 \times 80 = 6400$ meshes to the square inch.

That this is a very indefinite way of designating the fineness of powder is seen from the fact that the diameter of the meshes must vary with the diameter of the wire used in the sieve, the larger the wire the smaller the meshes, and vice versa.

Materials of Construction.—The netting of the sieve may be composed of various materials, according to the service for which the sieve is expected to be used. For coarse powders the netting is usually made from iron wire, preferably tinned. For the finer powders, the netting is better made from brass wire. For powders finer than No. 60, sieves of hair cloth or of bolting cloth are used. For general purposes the pharmacist should be provided with about four sieves, Nos. 20, 30, 40 and 60.

Sieves as commonly sold are circular, though a sifting box provided with a set of rectangular sieves will be found of convenience to the pharmacist. This is an oblong box with a removable lid, about half way down the inside of which two cleats are nailed on opposite sides for the sieve to rest upon. The sieves are square, and made to slide back and forth on the two cleats by means of a long handle which passes through a hole in one side of the box. By means of such a box the operation of sifting may be conducted without waste, and without covering articles in the vicinity with a layer of dust, as when the operation is conducted in the open air.

Better than the sifting box is one of the mechanical sifters which have come so largely into use within recent years. These vary in size from the small flour sifter made from tin to the large machine intended to be operated by steam power. The principle in all is essentially the same. The sifting medium is a curved sieve of wire over which brushes or rubbers are caused to revolve so as to brush the mixture against the meshes. Generally also a mixing arrangement is provided by means of which the contents are thoroughly mixed before sifting.

A mechanical sifter is of special usefulness in pharmacies where considerable quantities of baking or condiment powders are put up for sale.

Manner of Conducting the Process.—In sifting, the finer portions of the powder pass through first, consequently the sifted product will be more or less stratified and should generally have the different layers incorporated by subsequent mixing. When uniformity of fineness is required, the material should be lightly thrown from side to side of the sieves by a gentle shaking or inclining from side to side, and the operation discontinued when coarser particles begin to show upon the sifted powder. By stirring or rubbing the material in the sieve a larger portion will be passed through the meshes. This rubbing is to be avoided when bolting cloth is the sifting medium, since it is injurious to the fabric. For the separation of very fine or "dusted powders," sieves of bolting cloth are used, or in default of these, the powder may be shaken in a bag made of material of a suitable fineness.

Colation or Straining.—Straining connects Sifting with Filtration. In fact, sieves are frequently used as strainers. Colation resembles sifting in that straining media are

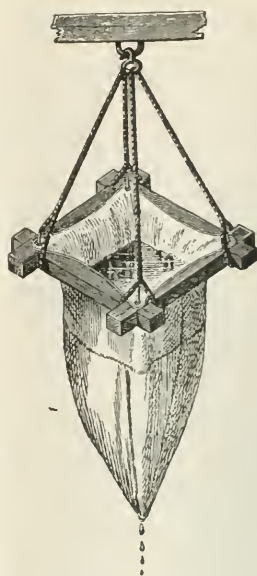


Fig. 44.—Straining Bag.

The straining material may be a plain, square or circular piece of cloth, or a triangular piece of cloth may be sewed up along two of its edges so as to make a long, conical bag, open at the widest part.

Strainers of the last pattern bear the traditional name of "Hippocrates sleeves."

Filtration.—Filtration is the separation of a solid from a liquid, or one liquid from another, by means of a *felted* medium pervious to the liquid but not pervious to the solid, or permeable by one of two mixed liquids but not by the other.

It is the felted character of the medium which distinguishes the process from straining and sifting, in both of which the pervious material consists of a meshed material made by weaving.

In a perfect felt there are no evident meshes, but the fabric is made up of matted and interlaced fibers, lying in all directions. It is owing to this that the openings between the fibers must be finer than in a woven material, and, as a consequence, capable of preventing the passage of much smaller particles than the latter.

Filtering materials may be divided as follows:

Filter beds composed of porous masses, as Charcoal, Sand, Powdered Glass, etc.

Filter beds composed of loosely packed fibers, as Paper Pulp, Asbestos Filters, and Absorbent Cotton.

Filters of Unglazed Porcelain.

Filters consisting of Felt-like Cloth or Paper.

In addition to their purely mechanical action in removing solid particles from a liquid which is passed through them, filters of certain substances, as charcoal, may act selectively by absorbing and deoxidizing organic matter in solution. It is to this property of selection that filters of wood and animal charcoal owe their valuable qualities as purifiers.

Of filter beds in general little need be said, except that there must be a suitable supporting diaphragm for the finer material, that the latter must be sufficiently thick, and that the material must be evenly distributed so as to avoid the production of channels.

All filter beds will in course of time become filled with impurities and worthless. They must then be replaced by new material, or purified by washing, if such be possible. In the case of such material as asbestos fibers or unbaked porcelain, purification may be effected by igni-

usually meshed like sieves, though generally made of cloth-like material, and are used to separate solids from liquids, instead of separating solids of differing fineness.

Straining media may be of muslin, linen, woolen cloth or felt, though when the latter is used the process is more properly called filtration.

The fabric used as a strainer may be placed inside a funnel and the liquid poured in, or supported on a hoop or wooden frame (Fig. 44), or if the vessel have a wide mouth, spread across in such a manner that it forms a concavity in the middle. It will be found useful for the pharmacist to be provided with several rings made from stout tinned wire, or several small wooden hoops to be used as strainer supports.

tion at a red heat, which destroys the organic substances and leaves the incombustible material of the filter unchanged.

The clogging of filters may be retarded to a certain extent by causing the liquid to pass upward through the filter, so that the sediment under the influence of gravitation will tend to fall away from the filtering medium, instead of filling up its pores.

Filters made from paper or felt cloth are usually in the form of an inverted cone, and are supported during the process of filtration by means of a funnel. Felt filters are usually manufactured in the form in which they are to be used (Fig. 45), while paper filters are bought in sheets and folded at the time of using.

Paper filters are folded plain or fluted. To fold a plain filter from a square piece of filter paper, first fold the paper across the middle line, and then at right angles to the first fold. The paper is now a triangle one-fourth the original size, and of four thicknesses of paper. (Fig. 46.)

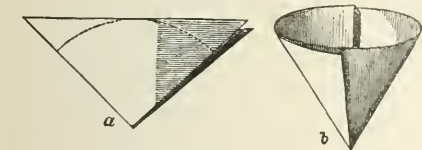


Fig. 46.—Folding Plain Filter.

With the scissors trim along the dotted line and open the paper so as to form a hollow cone which perfectly fits a funnel, the sides of which should have an angle of 60 degrees.

The plain filter is best for operations where a precipitate is to be washed and preserved, the plain sides permitting the ready separation of the substances.

To increase the surface of the filter and at the same time hasten the operation, the plain filter is converted into the Fluted or Plaited Filter.

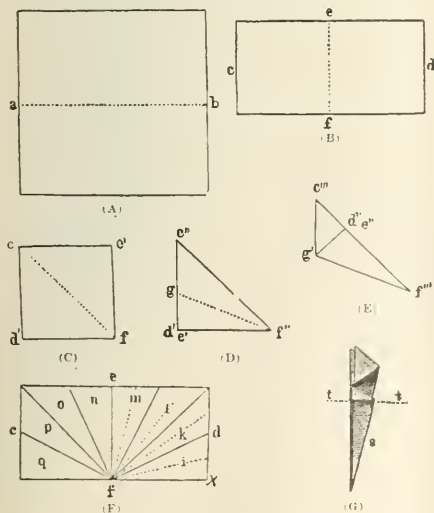


Fig. 47.—Folding Fluted Filter.

To do this, the filter paper (round or square) is folded along the line a-b (Fig. 47A), and then along e-f (Fig. 47B), resulting in the square (Fig. 47C). The square is then folded along e-f, (Fig. 47D) and the resulting tri-

angle folded along the lines g-f" forming the triangle shown in Fig. 47E. Upon opening the paper appears in the shape of a rectangle (double) as shown in Fig. 47F. Now beginning at the triangle d-f-x, make a fold along the middle of each of the triangles f i, f k, f l, f m, etc. (Fig. 47F), bending the paper back on itself in triangular form. The completed filter has the appearance of Fig. 47G. (cut off at t-t) and when opened out appears as in Fig. 48.

In folding filters, the creases should not reach entirely to the apex of the cone, since this is the part of the

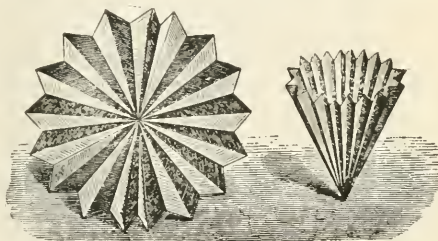


Fig. 48.—Fluted Filter Completed.

filter exposed to the greatest strain and most likely to give way.

Pressure Filtration. The Filter Pump.—In ordinary filtration the force which drives the liquid through the filter is gravity, or the weight of the liquid. In many cases, and especially in analytical work, it is desirable to hasten the process by supplementing the action of gravity by the pressure of the atmosphere. To accomplish this the stem of the funnel is connected with an air tight receiver from which the air is exhausted by means of a filter pump. The air by its pressure upon the top of the liquid drives the latter through the filter to the exhausted receiver.

When paper filters are used with filter pumps their points must be supported to prevent rupture, as by a cone of platinum, perforated to permit the passage of liquid, or by a plug of cotton placed in the neck of the funnel, or in some other manner.

The exhaustion of the receiver may be accomplished by any of the means used for producing a vacuum, but most conveniently by one of the several forms of aspirator specifically known as the filter pump. (Fig. 49.)

Those which operate by water pressure are very simple in their construction, consisting simply of a straight tube through which the column of water descends, and connected by a side tube with the vessel to be exhausted. The water tube is constricted at the point where the side tube enters, and expands again below, so that the water column tends to break at the point of enlargement, and thus draws out the air to fill the breaks, which is then swept down through the tube by the pressure of the water above.

Fig. 49.—Filter Pump.

Hot Filtration.—Many substances of thick consistence, as the fixed oils and fats, glycerin jelly, dense syrups, etc., can be strained or filtered only while hot, which is accomplished by the application of heat to the funnel or strainer in which the operation is being performed. Sev-

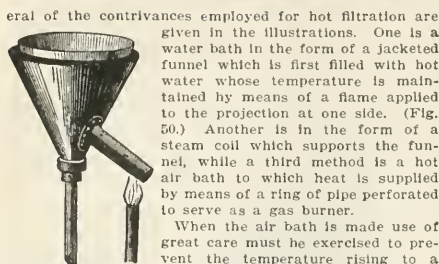


Fig. 50.—Hot-Water Funnel.

Separation by Dialysis.—Under the subject of pharmaceutical physics it was learned that under proper circumstances certain substances, known as *crystalloids*, can pass through animal membrane or parchment, while certain other substances, known as *colloids*, can not. The practical application of the process to pharmaceutical purposes is known as *dialysis*, and the apparatus by which it is accomplished is a dialyzer.

The construction and mode of using the dialyzer will be readily understood from the illustration. (Fig. 51.) It consists of an inner vessel of hoop or cylinder shape over one side of which there is stretched, like a drum head, a piece of bladder, parchment, or parchment paper.



Fig. 51.—Dialyzer.

The liquid to be dialyzed, say a complex mixture of organic materials, and supposed to contain an alkaloid or other crystalloid, is placed in this vessel and the latter suspended in or floated upon water contained in the larger outer vessel.

Under such circumstances the crystalloids will gradually diffuse through the membrane into the liquid in the outer vessel, while the colloidal matters, as gums, starch, gelatin, etc., will remain in the inner vessel. The liquid which diffuses or dialyzes through the dialyzer is known as the diffusate, and the liquid which remains behind as the dialysate.

For conducting the operation of dialysis the following facts should be borne in mind:

- 1.—The liquid in the outer vessel should be a perfect solvent for the substance which is to diffuse into it.
- 2.—The diffusion will continue only until the diffusate and dialysate contain an equal per cent. of the crystalloids. Consequently, if complete extraction of the latter is desired, the quantity of the liquid in the outer vessel should greatly exceed that in the inner, or else should be frequently replaced with fresh liquid.
- 3.—The rapidity of the diffusion increases with the concentration of the solution and the temperature at which the process is conducted.
- 4.—The membrane closing the inner vessel should be tightly attached and should be free from openings, to prevent leakage. If holes are present they may be closed with collodion, which is allowed to dry before using.

THIOCOL is the potassium salt of guaiacol-sulphonic acid, which has been introduced into therapy by A. Schwarz (Klin. Woch.). It contains about 60 per cent. of guaiacal and is in the form of a fine, white powder, which has a taste at first bitter, then sweetish. As advantages over other remedies are mentioned: Entire freedom from odor, great solubility in water, ready absorption and freedom from irritant action on the mucous membranes. It is claimed that these properties make it applicable for the most sensitive patients. Daily doses of from 10 to 15 gm. (150 to 225 grains), may be continued for a considerable time without disadvantage, which is of the greatest importance in the creosote treatment. It causes no nausea or diarrhoea. (Ap. Zig.)

(Written for the Era.)

DR. MEGAPHONE-QUACKENBOSS.

It was through my cousin Eva that I first met Doctor Quackenboss. She had originally been a trained nurse, and when Joe Crawford, the lumber king of the state of contracted typhus fever on a timber ship, she nursed him through it, and did it so well that Mr. Crawford considered she might as well nurse him for the rest of his life. When I graduated I happened to have some little time on my hands, and Eva very kindly invited me to spend a few weeks with them at their house in Sawyerville.

Sawyerville has very few attractions. It was twenty miles from a railway, and the place consists of a large mill, owned by Mr. Crawford, a "company store," a boarding house for the men, and about three dozen shanties and small frame houses. There are, however, plenty of trout in the river, and any number of ruffed grouse and woodcock in the woods. I am extremely fond of shooting and fishing, so I enjoyed my stay there very much. The nearest town is known as Lumberville, distant about fifteen miles, and it is hardly more than a village. Doctor Quackenboss resides there, and when anything went wrong at Sawyerville he used to be called in.

Something "went wrong" when I had been with the Crawfords about a month. One of the circular saws struck an iron bolt in a log; it was shattered to pieces, and the fragments flew through the building like shrapnel shot. A large piece passed between Mr. Crawford and myself (we had just entered the mill), and struck one of the workmen in the left arm above the elbow, breaking the bone, and severing the brachial artery. To avert the bleeding with an extemporized tourniquet was only a moment's work. The injured man was conveyed to a small building, used occasionally as an hospital, and Dr. Quackenboss was telephoned for. He was not at home, and nobody knew when he would be home, and Eva and myself went to work to apply a temporary dressing to the injury.

During her three years sojourn in Bellevue Hospital she had learned how to dress a wound quite as well as the average country doctor, and when Dr. Quackenboss arrived next day the patient was doing as well as any one could reasonably expect. The doctor removed the bandages, extracted one or two splinters of bone, and bound up the arm again. I was not present at the time, but I met him afterwards, and finding that I was a Ph. G. and had studied with a medical man for some years, he became excessively cordial. He called to see the injured man every other day for a fortnight or so, and by his instructions I watched the case in his absence. I had been used to seeing all surgical operations, no matter how trifling, conducted on strictly aseptic principles, and I must say that the sight of the doctor's amputating case and instruments filled me with respectful astonishment. His knives, saws, and bone forceps were anything but clean. He used ordinary sewing silk for ligatures, and his buggy case of medicines was about half filled and abominably dirty. He usually turned up about an hour before luncheon time; attended his patient, had luncheon with us, and talked politics to Mr. Crawford until half past three or four in the afternoon. Sometimes one of the hands or one of their families required advice, and on half a dozen occasions I heard him lamenting that there was no drug store in Lumberville.

I was on the lookout for an opening, and one evening I asked Mr. Crawford what he thought of Lumberville as a place to start business in. He told me that he had already thought of it, and that he considered it about the best opening in the State. The litigation that had tied up the lumber interest for ten years had just come to an end; a powerful company would shortly begin operations there, and a branch line of railway had been surveyed from the main line to the town, a distance of some thirty-five miles. There was no drug store in a radius of twenty-five miles, and in the course of two or three years the population of Lumberville would be more than doubled.

"But," he added, "and it's a great but, there is only one doctor, and if you or any other human being can pull with Megaphone Quackenboss, you will take the record from Job for patience and forbearance. I don't

care about Eva's visiting sick workmen, but it seems to please her, and so I don't say anything about it, but she and Quackenboss had an awful row over a child that got scalded. He was away addressing some political meeting, and she dressed the youngster's injuries herself. He turned up two days afterwards and raised Cain about 'an unqualified person presuming to interfere with one of his patients,' and she told him that in her opinion the best thing I could do would be to engage a qualified person who would look after the cases he got. We pay him six hundred a year, and the mill doesn't run more than seven months a year. He saw that she was in earnest, and subsequently apologized. But she hasn't forgotten or forgiven the incident, and I don't blame her at all. Many women would be at Bar Harbor, or some other beach, in the summer, instead of coming to this outlandish place, and a good many more wouldn't care if all the workmen in the mill were dead or not. However, I will sound Quackenboss on the subject, and if you care to try Lumberville, I will give you a couple of letters of introduction to people there, and you can go over and see the place for yourself."

Mr. Crawford was as good as his word, and one day very shortly after our conversation, Dr. Quackenboss invited me to spend two or three days at Lumberville with him. I accepted his invitation and drove over with him, and on our arrival I received a warm welcome from Mrs. and the two Misses Quackenboss. The aspect of the town was not inviting. It consisted of a square about five hundred feet each way, with two straggling streets leading to it. There were a number of vacant lots which were apparently utilized as a dumping ground for rubbish; the "streets" were desolate of sidewalks, and infested with pigs and loafers. At one end of the town stood the old mill, which had almost rotted down, and at the other end a tall chimney and some ruined walls were all that remained of a large tannery which had been burnt some years ago. Mr. Crawford had cautioned me not to mention the projected lumber deal to any one, so I kept quiet on that point.

The doctor's house had been the former mill owner's residence, but the building was in poor repair, the out-houses were almost in ruins, and the grounds, which had originally been well laid out, were now a wilderness affording pasture to a stray goat and a flock of geese. The doctor's "office" was a small building about 20x30 feet. The counters were covered with loafers, the floor was unswept, and the shelves recalled the passage in Romeo and Juliet:

"And about his shelves

A beggarly account of empty boxes,

Green earthen pots, bladders and musty seeds,

Remnants of pack thread and old cakes of roses

Were thinly scattered to make up a show."

This temple of Æsculapius was presided over by the doctor's nephew, Mortimer Fitz Clarence Megaphone. He was a young man of about twenty-five, who had been successively (but not successfully) a dry-goods clerk, a tree agent, and an itinerant vender of books. Having failed to make a living at these occupations, he had developed into a "druggist," and looked after his uncle's office in his absence, and the common report in Lumberville was that he and Lobelia Quackenboss were to be married at some indefinite period. Anamirta Quackenboss, the younger of the two sisters, was to be married to a lawyer in New York in about six weeks' time, and by a strange coincidence I was slightly acquainted with him.

I spent two days looking around the town, and finally I decided that if I could drive a reasonable bargain with the doctor I would locate there. My ready capital consisted of \$800, and Mr. Crawford had promised me "backing" to the tune of a thousand more, if I required it. Mortimer Fitz-Clarence and his uncle had had one or two serious quarrels before I happened on the scene, and he had already been advised to seek a new field to exercise his genius in.

To cut a long story short, I arranged to open a drug store in partnership with the doctor. He was to contribute \$400 in cash and his present stock in trade, and I was to invest \$800 in cash in the business. He was to do no dispensing whatever, and the business was to be run under the title of "Quackenboss & Nendan." I leased a somewhat dilapidated store for seven years for \$500 a

year, paying two years' rent in advance; purchased a small stock of patents, bottles, medicines and show cases, rendered the store habitable, and commenced business in Lumberville.

My first care was to dispense with the loafers who had infested the doctor's office. I cut away a platform which they used to roost on; banished chairs, stools and nail kegs from the store, and substituted a gravel incline for the wooden steps they loved to rest on, and in less than a month I had the place clear of them. I converted the checker board into kindling wood, and gave the general public to understand that their place was in front of the prescription case, and not behind it. The doctor paid me \$500 in cash before I went to Boston to buy stock, and I availed myself of Mr. Crawford's offer to the extent of \$200 more. Miss Lobelia brought down the serviceable part of her father's outfit in a perambulator—I think she made four trips—and I furnished a small office for the doctor and myself out of my own pocket. The doctor promised me the remaining \$100 as soon as he drew his salary from the mill, and in about a fortnight's time after our deed of partnership was recorded, we commenced business.

Everything went along smoothly for the first month or six weeks. I averaged about \$15 a day all told, and as our rent, taxes and running expenses were very small, and our labor bill nil, I considered that a very satisfactory beginning.

Our first falling out was in this wise. Dr. Quackenboss had asked me not to bother him with a lot of minor ailments, and very frequently I used to dispense cough mixtures, laxatives, and worm powders to his patients, especially the poorer ones, without referring to him. One day I made a Winchester of antelmintic syrup from a formula I had picked up in the Era. Several women purchased it for their children, and, the medicine being just as efficacious and infinitely more palatable than the combination of rhubarb, santonin and calomel my partner usually gave in such cases, there was quite a "run" on it. One of the Doctor's "star patients" purchased a bottle of it for her children, and told him that it was the best remedy she ever used. I noticed the Doctor's changed demeanor that afternoon, and on my mentioning to him that evening that we were short of Aromatic Cascara, he curtly informed me that we had better remain so. I manifested some surprise at his remark, and that unloosed his tongue. "Just what I was afraid of. You have begun to undermine my practice already with your confounded pastry-cook's receipts. I've run this practice for twenty years without using elixirs and syrups, and you are spending more money in a month in that trash than I ever spent in a year. You've no right to go prescribing over the counter for my patients, dosing them yourself and doing me out of my fees; and another thing, I won't have alkaloids like santonin prescribed at all, unless I order them myself."

Now, when a man expressly asks you to attend to minor ailments, and not to disturb him, and then "goes for you" for following his instructions, I think anyone has a perfect right to feel aggrieved. I said so rather plainly, adding that I did not object to his criticism of the formula, but that I could not acquiesce in the discovery that santonin was an alkaloid. He corrected himself by adding that I needn't be so "smart," and that the coal-tar products were even more dangerous than some of the alkaloids. I turned up the article santonin in the Dispensatory, but he merely glanced at it and walked out of the shop. Next morning he was as pleasant as ever, and for some time all went well again.

His daughter had been married about a week before I opened the store, and Lobelia was away visiting some relatives. I had only visited his home a couple of times (except on business matters) in the two months I had been in business, as my hours were from 8 a. m. to 9 p. m., and I had plenty of work in the evenings, posting books and working in the "back shop."

About this time the Sawyerville mill closed down, and I sent Mr. Crawford an order on the Doctor for \$100, in part payment of the \$200 I had borrowed from him. That raised another awful row. The Doctor was afraid to refuse the order, but he was furious with me, and intimated that it was some of Mrs. Crawford's work. Another thing which enraged him very much was a present my cousin

made me. It consisted of a very handsome pocket surgical case. It may have cost her fifty or sixty dollars, and it was very little use to me, but as I might at any time have to take temporary charge of a surgical case in his absence, I could not see why on earth he objected to my owning it.

At the end of three months, I struck a balance and declared our first dividend. We had increased our stock very considerably, and we had \$150 to divide. This led to another row. My partner said that as we had taken in about \$1,200, and the profit on drugs was cent per cent, we ought to have \$600 to divide. I tried in vain to make him understand the difference between gross and net profits, and to get him to realize that the cash we took in had to be used to replenish the goods which were out on credit, and to procure our winter's stock, etc., but I failed to do so. He found fault with me for buying too largely, and spending money on "patent trash," quite oblivious of the fact that if we didn't handle patent medicines, the general stores would, and that if I didn't keep a decent line of drugs, the Lumberville people would send away for them, as they had been in the habit of doing before I opened.

When this episode had passed, Miss Lobelia wanted to go to New York to visit her sister. The Doctor was short of money, and wanted me to join notes with him to raise the required amount. This I refused to do, couching my refusal in the most civil terms I possibly could. (I only joined notes once, and then I had to pay the whole bill myself.) There was another row over this, and yet another one when I declined to take Mortimer Fitz-Clarence as a clerk. He was rather too fond of poker and whiskey to make a good drug clerk, and I verily believe he would have smoked a hundred cigars a week. In this way I dragged through about eight months.

Acting on Mr. Crawford's advice, I invested all the spare cash I had in two vacant lots on the main street. I paid \$225 for the two; \$100 in cash and the balance on mortgage. In the spring the boom began. Work commenced on the railway. The new lumber company commenced building a large mill. Another company was formed to develop the pulp and woodenware industry, and Lumberville and its inhabitants awoke from their ten years' lethargy and began to realize that there was some other object in life besides mere existence. Our business increased to \$25 a day, and the Doctor had all he could do to attend to his practice. In fact, he was too busy to row with me. The business paid him a monthly dividend of \$60. I spent eleven and twelve hours a day in the store, compounding prescriptions, refilling my stock bottles and attending to minor ailments. The Doctor even forgot his politics and the wrongs he had received at the hands of the Democratic party when he supported it some years ago, and for two or three months everything went harmoniously.

Early in the fall, however, there was an election. The Doctor had once been a rabid Democrat, but not having received what he considered fair treatment from his party, he had a few years previously changed his politics and become an equally ardent Republican. The Democratic party were far the stronger side in Lumberville, and their opponents hardly thought it worth while to bring out a candidate for the State Legislature in that district, but eventually they chose Dr. Quackenboss as the leader of their forlorn hope, and from the minute he received his nomination he forgot practice, business, patients and drug store. I have always been a Democrat, and so has Mr. Crawford. Neither of us ever took any prominent part in politics, but we would almost as soon have changed our religion as our political opinions, and that was just what the Doctor expected us to do. Mr. Crawford, who was used to his ways, only laughed at him. I told him that our deed of partnership did not oblige me to vote for him or render him any assistance in the campaign, and he "boiled over," as usual. For six weary weeks the drug store and office were infested with loafers and ward heelers, and for six weeks the Doctor talked politics, morning, noon and night. The election came off, and the Doctor was defeated by a very large majority, and found that he had not only several hundred dollars to pay, but that he had alienated a number of his best patients.

The town had been building up all that summer, and I warned him that unless he attended more closely to his practice, and ceased to rake up old political grudges, he would find a rival practitioner established some day. Within a month of my telling him this, it actually came to pass. The new comer was a Canadian by birth, and a graduate of McGill University. He had also taken a post-graduate course at Edinburgh, and a special course in gynecology and obstetrics at Harvard. Within a month of his arrival in Lumberville he had laid the foundations of a good practice, and I saw at once that it was only a question of a few weeks before he got the Sawyerville business as well. Dr. Quackenboss refused to recognize or consult with him at all. He even forbade me to furnish him with any drugs or fill his prescriptions. Of course I ignored his orders, as the new comer was "good pay," and had no wish to keep a stock of drugs or import a druggist of his own.

The climax to our disagreements was not very far off, however, and arose as follows: A certain cash register concern sent a traveler to Lumberville. They made a very fair register, which they sold "on time" at a very high price. I had no objections to having a cash register in the store, but I did not care to pay \$90 or \$70 more for it than I could buy it for in Boston. During my absence the Doctor ordered a \$250 register, to be paid for in twelve monthly instalments. I knew where I could buy one as good for \$100 cash, and as the Doctor had already overdrawn his account some \$200, I was obliged to write the firm and cancel the bargain.

The scene which occurred when I told my partner this fact can hardly be imagined. He cursed the Crawfords, myself, the people of Lumberville, the Democrats who had thrown him over, and the Republicans who had not given him enough support, until the office was blue. He then went out in the shop and met the new doctor, who had just brought in a batch of prescriptions. Taking him by the collar, he called him an adjective thief, and proceeded to put him outside the store. The new comer offered no resistance until he was on the street, but the moment his feet were on the highway, he slipped from Dr. Quackenboss's grasp like an eel, and tripped him into the gutter, where he cut his head rather severely. I did not take any part in the disturbance, but next day I had to appear in the police court as a witness against my partner. He was fined \$10 and costs on my evidence, and received a very severe reprimand from the Justice who tried the case.

I came to the decision that there were better ways of making money than running a business in partnership with a lunatic, and I took immediate steps to dissolve the firm. I expected another scene when I told him of my determination, but his creditors were pressing him hard for the money he had spent on his election, and he closed with my offer of \$500 for his share in the business. In about a year he had received \$900 in dividends, and when our accounts were squared, I had \$300 in cash to pay him, which I did not consider a bad return on his original investment of \$100.

I instantly supposed that the termination of our partnership would put an end to prescription work, as far as he was concerned, but such was not the case. The town was too small to support another druggist, and after a week or two he sent me a small worded card. Dr. O'Brien, the new practitioner, was a great worker and a business man, and it soon became evident to Dr. Quackenboss that if he wished to make a living at all, he would have to abandon politics and attend to his practice. That was eight years ago, and at the present day he is still in Lumberville. The place is an incorporated town now; there are two drug stores and four doctors. Dr. O'Brien has by far the best practice, and he and Quackenboss have made up their old feud. The latter has not addressed a political meeting for five years, and he has managed to restrict himself to about one row in six months. When he reads his newspaper, he went to work, he soon regained some of his lost ground. He invested the money he would have otherwise spent in politics, in up-to-date books and modern instruments, and not more than a month ago he told me: "If I hadn't made an ass of myself in that affair with O'Brien I should have been a good many thousand dollars in pocket." I said nothing, but I fully realized the truth of this observation. The Doctor's unchangeable temper and unbridled tongue had lost him more patients than his lack of professional skill could ever have done, and had curtailed his income for many years in a way that his deficiency in business ability would have been powerless to effect. He is now tolerably well off, and I earnestly hope he may long continue so.

"THERSITES MENDAN, Ph. G."



GROUP OF SPANISH ARTILLERY OFFICERS.

(Special to the Era.)

SPANISH ARMY PHARMACISTS.

The "Sanitary Corps" of the Spanish Army, like that of most European nations, includes a complete and properly-graded body of pharmacists. At the present juncture a few facts and figures on this point may be of current interest.

IN OLDEN DAYS.

A sanitary service has long existed in Spain. In the olden days the healing art was, of course, practised mainly by the monks. Several orders devoted themselves to what is now called "Red Cross" work, the best known being the *Hermanos de San Juan de Dios*. In the expedition against the Moors of Granada in 1570, as in John of Austria's fleet which attacked the Tunisian pirate Uluc-Alí two years later, we find these "Brothers of St. John." That apothecaries as well as surgeons were included in their ranks is evident from their muster roll at the siege of Fuenterrabia in 1638,—a superior, a priest, two surgeons, a head infirmier and 6 assistants, and one "Boticario." Nor were medical stores forgotten, for Geronimo de Mascareñas, describing the Spanish army during the Portuguese campaign of 1662, states "These two convoys were followed by the hospital, with the medicines, drugs, and comforts necessary for the cure of the sick."

The brotherhood of St. John appears to have been the principal sanitary corps until about 100 years ago. We may just note in conclusion that the 1,500 men wounded in Admiral Rodney's combat with the Spanish squadron off the Lucayas in 1779 were cared for at Havana by these ubiquitous churchmen.

More modern institutions made their appearance in the eighteenth century. Without presuming to trace the growth of Spanish military hospitals, we may just quote from the Royal ordinance of 28th September, 1704, the pay of the staff at the "Hospital del Exerccio."

"One Doctor, who will enjoy 200 crowns (escudos) per month; Head Surgeon, 140 escudos per month; the Apothecary, 100 crowns per month; 2 Assistant Surgeons, 100 crowns each."

THE PHARMACEUTICAL CORPS

on a modern basis, may be said to date from 1800, when the "Royal ordinances for the rules and government of the Faculty of Pharmacy" included (chapter V.) the "Rules to be observed in the Pharmacies (Boticas) of the

Armies and Navies of His Majesty." Things dragged on for 20 or 30 years (for the invasion of Napoleon and its consequences occurred at this epoch), and the laws drafted in 1823, 1830 and 1836 were revised in 1846, 1853, etc. It would be tedious and uninteresting to follow the tardy and fluctuating legislation. Suffice it to say that each succeeding law recognized that pharmacists, like physicians and surgeons, should receive "in peace as in war, pay equal to that of the officers of the army to which their rank corresponds," and that the "Rules for the management of the Central Laboratory and Medical Stores" date from 1873.

A FEW FIGURES.

The number of Army Pharmacists fluctuates with the necessities of the service. An eloquent proof of the exertions made by the Spanish authorities to retain Cuba and the Philippines may be read in the figures tabulated below, which are copied from the "Escalafo General" of the officers of the "Cuerpo de Sanidad Militar," published annually at Madrid at the commencement of January.

The figures for 1883 may be taken as the "peace footing."

(1883 Pharmacists.)

	In Spain.	Cuba.	Porto Rico.	Philipp. pines.	Total.
Second-class inspector.....	1	..	..	..	1
First-class sub-inspector....	2	..	..	..	2
Second-class sub-inspector..	3	..	..	..	3
Head pharmacists	8	3	..	1	12
First-class pharmacists.....	18	16	1	4	39
Second-class pharmacists....	18	..	..	..	18
	50	19	1	5	75

Seventy-five pharmacists in all.

1887. (Pharmacists.)

	In Spain.	Cuba.	Porto Rico.	Philipp. pines.	Total.
Second-class inspector.....	1	..	..	..	1
First-class sub-inspector....	2	1	..	..	3
Second-class sub-inspector..	4	3	..	..	7
Head pharmacist	8	14	2	3	25
First-class pharmacist	21	24	2	9	56
Second-class pharmacist....	19	21	..	..	42
	55	63	2	14	134

Temporary pharmacists....	8	1	..	..	9
	63	64	2	14	143

One hundred and forty-three pharmacists in all.

Considering that on a peace footing France has 114 military pharmacists, Italy 106, and the great armies of Russia and Germany a little over 200 each, this figure is evidently high for a small country like Spain. It was, however, found insufficient, and during one month only (January, 1897) 23 "temporary" pharmacists were engaged—twelve for Spain, seven for the Philippines, three for Cuba and one for Melilla. These men receive 2,000 pesetas a year. The annual pay and the rank of the regular pharmacists are stated as follows:

Pesetas.

Second-class inspector.....	9,000....	General of Brigade.
First-class sub-inspector.....	6,000....	Colonel.
Second-class sub-inspector.....	5,400....	Lieut. Colonel.
Head pharmacist.....	4,800....	Major (comandante).
First-class pharmacist.....	3,000....	Captain.
Second-class pharmacist.....	2,600....	Lieutenant.

On January 1, 1898, the military pharmacists were distributed as follows:

1898. (Farmaceuticos.)

	In Spain.	Philipp. Porto Rico.	Tal.
Inspector 2 ^a clase.....	1	..	1
Sub-inspector 1 ^a clase.....	4	1	5
Sub-inspector 2 ^a clase.....	3	1	5
Farmacéutico mayor (head pharmacist).....	10	11	4
Farmacéutico primero (first-class pharmacist).....	22	24	9
Farmacéutico segundo (second-class pharmacist).....	28	17	6
Provisionales (temporary pharmacist).....	9	10	8
	57	64	28
			2
			171

The inspector is always stationed at the Central Laboratory at Madrid. He is aided by a second-class inspector, a head pharmacist, two first-class and three second-class pharmacists. One first-class sub-inspector is attached to the Junta Consultativa or Chief Committee at the Ministry of War, as well as a first-class pharmacist. The pharmacy at the Madrid military hospital is supervised by a first-class sub-inspector, while another directs the Central Laboratory at Malaga. There is a second-class sub-inspector at the Madrid hospital, and another at Barcelona. Eight of the "head pharmacists" are stationed at the hospitals of Seville, Saragossa, Valencia, Burgos, etc. One is attached to the Ministry of War, where we also find a first-class pharmacist, both being classed with the doctors, vets., and other administrative officers who regulate the sanitary, judicial and other business of the army in the Fourth Section of the War Department.

Of the other pharmacists, four are engaged in the army laboratories (two at Malaga, two at Barcelona); six in military pharmacies (three Madrid, three Seville), the remainder being distributed throughout the various military hospitals in the capital and the provinces.

The exact location of the pharmacists posted in Cuba and the Philippines is not stated, but they are mostly to be found in the larger towns, where military hospitals are provided.

RAPID METHOD OF DETERMINING THE ARSENIC CONTENTS IN THE MINERAL ACIDS.

By DR. W. MINOR, of the Missouri Commercial Laboratory.

There seems to be a large number of chemists now engaged in testing a great variety of substances for arsenic by the various analytical methods of this or that authority, apparently with the sole view of disputing, one with another, and each with all the rest, as to the degrees of sensitiveness of this particular test.

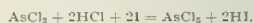
My long experience as court and city chemist at various times and places in Germany, as well as my long connection with analytical and manufacturing chemistry in the various branches of the chemical industries, make me regard the innumerable articles written on this subject from one standpoint only, and that from the ridiculous side. They invariably recall the words of the Roman satirist: "Parturiunt montes, nascetur ridiculus mus."

*The mountains are in labor—a ridiculous mouse will be brought forth.

It is a fact well known to chemists that it is more difficult to find materials free from arsenic than to detect the presence of that substance in the various commercial materials. How many chemicals (in their commercial condition) are entirely devoid of arsenic?

According to my idea, when we are required to test a substance quantitatively for arsenic, we should endeavor to determine the amount of that substance that is present by a quick but accurate method, rather than waste time over tests that will indicate very small traces of the same. Particularly is this the case in the commercial, and even so-called pure, mineral acids, in order that we may thereby judge the uses to which they can be put in their present condition.

Method.—In my opinion, in such cases the iodine method is the best and quickest. Let us take, for example, hydrochloric acid. In this, the arsenic is present as arsenous chloride, $AsCl_3$. This is converted into arsenic chloride $AsCl_5$, by oxidation with iodine solution, according to the following equation:



The reagent necessary for this determination is the n-50 iodine solution, using a freshly prepared starch solution as an indicator.

Weigh off 10 grams of the acid and bring it into an Erlenmeyer flask of about 250 ccm. capacity, and add an excess of acid sodium carbonate. As soon as the generation of carbonic acid has ceased, dilute with more water (from 50 to 50 ccm.) and pour in a few ccm. of starch solution.

Now titrate with the n-50 iodine solution under constant agitation, until a permanent blue color appears.

As 1 ccm. of the iodine solution corresponds to 0.000699 gm. As_2O_3 , or 0.00186 gm. $AsCl_3$, the number of cubic centimeters of the iodine solution used, multiplied by 0.00186, gives the amount of arsenious chloride contained in the 10 grams of the sample used, and by multiplying this product by 10, the percentage of arsenious chloride present in the sample is obtained.

The following table shows the quantity of arsenious chloride present in six samples of hydrochloric acid, analyzed in our laboratory:

Sample.	Ccm. Iodine Solution.	Percentage of $AsCl_3$.
1.....	0.2	0.0037
2.....	3.5	0.065
3.....	6.0	0.128
4.....	0.1	0.00186
5.....	22.3	0.41
6.....	14.4	0.27

The method I have just described may be employed in the majority of cases for the determination of arsenic where the latter exists in the shape of an arsenious compound. When we have to do with arsenic acid, salts or compounds, these must first be reduced before the iodine method can be made available.

When a sample of hydrochloric acid, presented for analysis, is found to contain free chlorine, the latter must be eliminated before proceeding with the iodine method as described above, since the uncombined chlorine attacks and decomposes the potassium iodide of the test solution. To test for this condition the following process is recommended: Into a suitable flask pour 25 ccm. of the hydrochloric acid, and to it add one drop of indigo solution. If the color of the solution is destroyed, the presence of free chlorine is established. The removal of the chlorine is accomplished by passing a stream of dry atmospheric air through the sample of the acid, continuing the same for about fifteen minutes, when the sample will be found ready for analysis by our method.

The results of the six foregoing analysis demonstrate that samples 1 and 4 are sufficiently pure for employment in the preparation of a great number of preparations, without further purification. They, along with sample 2, can be used for preparing hydrogen sulphide for any purpose, and they can also be applied to any cleaning process whatever.

The amount of arsenic in Nos. 3, 5 and 6 is too high for laboratory work, and it is not even advisable to employ them for cleaning metal wares, on account of the large quantity of hydrogen arsenide evolved in this process. They can, however, be utilized for cleaning glass and porcelain dishes. (Nat. Dr.)

PHARMACY.

OLEUM SALOSANTALI, or salosantal, is an internal remedy for diseases of the urinary organs. It is a solution of 33.1-3 per cent. of salol in East Indian oil of santal, to which a little oil of peppermint is added to improve the taste. It is a clear, light yellow liquid, having the appearance of purified oil of santal. In the cold a deposit is formed, which probably is stearoptene from the oil, and not salol. The remedy is used in form of drops—three times daily, ten drops after meals—or in gelatine capsules containing 0.5 gm. (8 grains) each, two capsules three times daily. (Ap. Ztg.).

AIODIN is a preparation obtained from the thyroid gland, which contains all active constituents of the gland combined with tannin. Dr. O. Lanz, of Bern, was able, by administration of fresh or dried thyroid gland, its juice, or Aiodin, to keep alive dogs which had been deprived of the thyroid gland, but could not do so with iodothyron, or the iod-albumins of the gland. Aiodin keeps unchanged for years, whereas thyroëidin gradually decomposes. It contains 0.4 per cent. of iodine, and is equivalent in strength to twice its weight of dried gland and ten times its weight of fresh gland. (Ph. Post.).

BROMOXAZOLID and **CHLOROXAZOLID** are new synthetic products recently patented, and intended for medicinal use, either as such or in form of derivatives. Bromoxazolid is prepared by heating for some time on a waterbath a solution in glacial acetic acid of a mixture of ortho-acetyl-para-brom-phenol and phenyl-hydrazin. Recrystallized from alcohol, it forms yellow, shining leaflets, which melt at 167° C. It is insoluble in dilute alkalies. Chloroxazolid is the corresponding chlorine compound prepared in a similar manner from ortho-acetyl-para-chlor-phenol and phenyl-hydrazine. This consists of yellow crystals, which melt at 172° C. (Ap. Ztg.).

SOLUTION OF ITROL.—O. Werler (Klin. Woch.) gives the following directions for preparing clear and permanent solutions of itrol, or citrate of silver: A bottle of brown glass is first rinsed with distilled water, the weighed itrol then introduced and shaken with a small quantity of distilled water. Boiling water is then slowly added with shaking of the bottle, until the prescribed quantity has been added. The solution so prepared is perfectly clear and without sediment, if a pure salt is used. The bottle is closed with a glass-stopper or a cork covered with wax-paper. (Ztsch. f. Ph.).

SERUM OF MERCURALIZED ANIMALS.—Experiments of Tarnowski and Jakowlew, to treat syphilis with serum from horses that had been inoculated with syphilis-virus, gave entirely negative results, while treatment with the serum of mercurialized animals was decidedly unfavorable. The horses were mercurialized with injections of calomel during two and a half months, others with mercury salicylate and phenol. Patients to whom injections of the serum from these animals were administered, became worse, with symptoms of albuminuria, eruptions, loss of weight, fever and glandular swellings, particularly in the shoulders. Immunization against syphilis was also unsuccessful. (Ph. Post.).

DISINFECTING POWER OF CRESAPOL.—Tavel and Tomarkin have made extensive experiments to determine the value of cresapol as a disinfectant. They found that for certain bacteria, as *Bacillus pyocyaneus* and *Bac. coli*, a ½ per cent. solution of cresapol is less effective than a solution of lysol of the same concentration, but that more concentrated solutions of the two substances are equally effective. Mixed with a 1 per cent. solution of caustic soda, cresapol makes a very suitable solution for the sterilization of instruments, and can replace lysol for this purpose. It makes a perfectly clear solution, in which the instruments are plainly visible, a distinct advantage. (Ztribl. f. Bakt., through Ap. Ztg.).

CHINOSOL (oxy-quinoline-sulphonate of potassium), which has been used externally for disinfection to a considerable extent, has lately been found to give very favorable results when given internally in certain diseases. Dr. Penafiel, in Mexico, has been successful in treating croup with injections of chinisol, and also found it to give excellent results in intermittent and typhoid fevers. He regards it as a certain remedy in these diseases, and in view of the fact that it is comparatively harmless (1 to 2 gm. (15 to 30 grains) may be taken daily without danger), recommends it in many cases as a substitute for quinine and antipyrine, particularly as the latter is frequently injurious to the health. (Drog. Ztg.).

TREATMENT OF HYDROPHOBIA WITH NERVE SUBSTANCE.—In 1889 it was observed by Babes, that certain persons were cured through Pasteur's treatment for hydrophobia, also of neurasthenia, epilepsy, melancholia, etc. He then tried the treatment of these affections with injections of the nerve substance of sheep and hares, which proved successful. Babes then determined that the anti-hydrophobia substance in immunized dogs is present only in the blood and the nervous system. It was therefore to be assumed that the normal nerve cell would offer a direct resistance to the hydrophobia-toxin and produce the antitoxin to a certain degree. Experiments showed that in the test-tube the neutralizing effect of nerve substance was very slight. Better results were obtained with living animals. Hogs infected with hydrophobia were treated with daily injections of 5 gm. of an emulsion prepared from the normal nerve substance of sheep, and were mostly cured, while animals not so treated died without exception. (La Med. Mod., through Ap. Ztg.).

MEAT SUBSTITUTES.—In Hyg. Rdsch., E. Roth reports comparative experiments made by Bernstein regarding the value of recently proposed meat substitutes. In order to meet the requirements, they must comply with the following conditions: 1. They must be soluble in water. 2. They must have an agreeable taste. 3. They must be well assimilated when taken in large quantities. 4. The price should be moderate. These requirements are met best by Nutrose, which is completely soluble in water, of indifferent taste, particularly in soups, and assimilated more completely than meat in larger quantities. Peptone is easily soluble, but has a disagreeable taste, and is therefore useless for most purposes. It can be taken only in small quantities. Somatose dissolves readily in water and has an agreeable taste, but can be borne only in small quantities. It is rather a stomachic than a food. Alenurate, which is very much cheaper than all others, is insoluble in water, but has little taste, is well borne by the stomach and is well suited as an addition to all kinds of bread and pastry. (Ph. Post.).

INCOMPATIBILITIES OF GLYCEROPHOSPHATES.—Ed. Crouzel (L'Union Phar.), makes some observations on certain reactions which may take place in mixtures containing glycerophosphates. In most cases a precipitate is formed through the disassociation of calcium glycerophosphate by a double decomposition, consisting of calcium tartrate, malate, etc. It has been proposed to prevent precipitation of calcium salts by the employment of carbonic acid, but the author does not recommend this, on the ground that the reaction is not prevented thereby, but simply masked. It should always be kept in mind that glycerophosphates are very unstable and readily change under chemical and physical influences. For this reason they should be prescribed alone, whenever possible, in powders, cachets, etc., or dissolved in distilled water, simple syrup, or best of all, in neutral glycerine, but never in complex solutions, such as wines, elixirs, compound syrups, etc., nor in acid and alkaline solutions. If the alkali glycerophosphates seem to escape these incompatibilities, which are so frequently noticed with the calcium salt, it is only that the new compounds formed in the decomposition remain in solution, but may have very different therapeutical effects from those intended.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

"Foam" for Soda Water.

(R. B. H.) see issues of this Journal, July 22, 1897, page 112, and April 7, 1898, page 513.

To Remove Ink Stains.

(A. C.) See Era, March 31, 1898, page 477. The stains produced by indelible ink containing silver nitrate may be removed by soaking the garment in a solution of common salt and then washing with ammonia. Another method recommended is to treat the stains with iodine and then potassium iodide solution.

Confectioners' and Decorators' Trade Journals.

(L. W. M.) For the first-named address the "Confectioners' Journal, 215 S. Fifth St., Philadelphia," or the "Supply World, 137 Franklin St., this city. The following are journals devoted to decorating and furnishing: "Decorator and Furnisher," "Painting and Decorating," "Furniture Trade Review and Interior Decorator," "Art Interchange," all of this city. The "Interior Decorator" is a monthly, published in Chicago.

Tincture Iodine and Fluid Extract Hydrastis.

(C. K.) asks if the following prescription should be filtered before handing it to the patient:

Zinc sulphate 3 grains
Fluid extract hydrastis ½ ounce
Tincture iodine 10 minims
Water, enough to make 4 ounces
For external use.

No, a bad looking mixture results (due to the incompatibility between fluid extract hydrastis and tincture of iodine) but as it is intended for external use it may safely be dispensed. The therapeutic value of iodine in a mixture of this character is an unknown quantity.

Glycerin, Sodium Bicarbonate and Sodium Borate.

(S. S.) asks what causes the effervescence in the following prescription:

Sodium borate ½ dram
Sodium bicarbonate ½ dram
Oil eucalyptus 2 minims
Oil gaultheria 2 minims
Thymol 1½ grain
Glycerin 1 ounce
Water, enough to make 2 ounces

The effervescence is due to the generation of carbon dioxide. The reaction is a well known one and is thus explained: Glycerin in the presence of water decomposes borax, forming sodium metaborate and boroglycerol. Water reacts with the boroglycerol to give glycerin and boric acid. The boric acid with sodium bicarbonate gives sodium borate and carbon dioxide. Other polyhydric alcohols, such as mannitol, dextrose, levulose, and glucose, act like glycerin in decomposing borax. This mixture should be made in a mortar and then be allowed to stand until effervescence has ceased before attempting to bottle it.

Saccharin for Soda Syrups.

(L. A.) The American agents of saccharin furnish the following information: Since "body" is considered an essential feature in soda syrups, saccharin is used in their manufacture in combination with sugar, in equal proportions, as regards sweetening power, using one ounce of saccharin "500" and 32 pounds of granulated sugar in place of 64 pounds of sugar, in the following manner:

Heat in an earthen or enameled vessel 1 gallon of water to the boiling point; after removing it from the fire, stir in one ounce of saccharin "500" until it is dissolved.

Then add this mixture to the 32 pounds of granulated sugar, which have been previously dissolved in 7 gallons of water, either hot or cold. A total quantity of about ten and one-third gallons of syrup will thus be obtained. Flavoring and acids may now be added in the usual manner, except that 15 per cent. or 20 per cent. less of these will be required where saccharin is used. Syrup thus made mixes more readily than does sugar syrup.

Such a syrup is equivalent in sweetness to one containing about 6.2 pounds of sugar in a gallon. A gallon of concentrated syrup represents but 7.39 pounds of sugar (and this is denser than the U. S. P. syrups); it is therefore apparent that from the proportions above given a very sweet syrup will be obtained; if too sweet, add as much more water as your taste directs.

Nail Bleach and Polish.

(J. M. C.) A solution of oxalic or tartaric acid may be used as a "bleach." Try the following:

Tartaric acid 30 grains
Rose water 1 ounce

Most nail polishes, however, contain oxide of tin, and may be either pastes or powders. The following preparation has been found very satisfactory:

Oxide of tin 2 pounds
Carmine 3 drams
Oil bergamot 75 grains
Oil lavender 75 grains

Nail Varnish or Polish.

Paraffin wax 60 grains
Chloroform 2 ounces
Oil rose 3 drops

The Era Formulary gives the following formula for—
Finger Nail Dressing.

Sulphuric acid 5 drops
Tincture of myrrh 1 dram
Water to make 4 ounces

Mix.

First clean the nails with a stiff brush and soap, and then plunge them into the above mixture and hold them there for five minutes.

Face Bleach.

(H. M.) Many preparations of this character contain corrosive sublimate, the indiscriminate use of which is questionable and should be discouraged. Some of these preparations are directed to be applied once or twice a day to the face, after first washing in hot water, and subsequently washing again a short time after the application has been made. Other preparations of a similar nature are sometimes applied to the face at night upon two or three thicknesses of linen cut to fit, removing them when dry. An ointment or cold cream is gently rubbed in night and morning to correct any redness of the skin which sometimes follows the application of the wash.

The following mixture has also been recommended as a face bleach, and, as it contains no poisonous substances, seems to be a very desirable one:

(1) Bismuth subnitrate 4 to 6 drams
Glycerin 2 drams
Water 4 ounces
Perfume, a sufficiency.

The Era Formulary gives the following:

(2) Beta-naphthol 5 grains
Glycerin 3 ounces
Cologne 3 ounces
(3) Sodium borate 3 drams
Boric acid 20 grains
Any perfumed toilet water 1 pint
(4) Magnesium sulphate 60 grains
Rose water 12 ounces
Orange flower water 4 ounces
(3) Bismuth oxychloride 1 ounce
Water 1½ pints
Rose water ½ pint
Oil neroli 5 drops
Spirit of sandal wood ¼ dram

Triturate the mixture very thoroughly.

List of Pharmaceutical Journals.

(M. J. A., New South Wales.)—The offices of publication and subscription rates of the pharmaceutical journals you name are as follows: Spatula, Boston, Mass., monthly, \$1 per year; Pharmaceutical Review, Milwaukee, Wis., monthly, \$2; National Druggist, St. Louis, Mo., monthly, \$1; Meyer Bros. Druggist, St. Louis, Mo., monthly, \$1; Western Druggist, Chicago, Ill., \$1.25; Rocky Mountain Druggist, Denver, Colo., monthly \$1; Alummi

Report (published by the Alumni Association of the Philadelphia College of Pharmacy) Philadelphia, Pa., monthly, \$1; Bulletin of Pharmacy, Detroit, Mich., monthly, \$1; American Druggist and Pharmaceutical Record, New York, N. Y., semi-monthly, \$1.50; Druggists' Circular, New York, N. Y., monthly, \$1.50; American Journal of Pharmacy, Philadelphia, Pa., monthly, \$3; New England Druggist, Boston, Mass., monthly, \$1; Canadian Druggist, Toronto, Ont., monthly, \$1; Canadian Pharmaceutical Journal, Toronto, Ont., monthly, \$1; Montreal Journal of Pharmacy, Montreal, Quebec, monthly, \$1. The rates given are for local subscription only; most publishers have an additional charge on foreign subscriptions on account of the increased cost of postage.

French Journals: Les Nouveaux remèdes, Paris, bi-monthly; Journal de pharmacie et de chimie, Paris, bi-monthly; Repertoire de pharmacie, archives de pharmacie et journal de chimie médicale réunis, Paris, monthly; L'union pharmaceutique, Paris, monthly. German: Apotheker-Zeitung, Organ of Deutsche Apotheker-Verein, Berlin, semi-weekly; Sueddeutsche Apotheker Zeitung, Stuttgart; Pharmaceutische Post, Vienna, weekly; Pharmaceutische Centralhalle, Dresden, weekly; Pharmaceutische Zeitung, Berlin, semi-weekly; Zeitschrift des allgem. oesterreich Apotheker-Vereins, Vienna, Austria, three times a month; Pharmaceutische Zeitschrift für Russland, St. Petersburg, Russia. You should address the publishers of these journals for subscription rate, etc.

Liquid Peptone.

(Doctor.) We cannot give the formula for the proprietary article. However, peptones are formed by the action of pepsin, or pepsin and pancreatin on albuminous foods or substances, the result being partially digested foods fitted for assimilation. Upon this line manufacturers have introduced preparations containing peptones to aid deficient peptic digestion. Albuminous foods or substances may also be digested by means of some one of the various vegetable ferments, as papayotin, etc.

According to Wood a beef peptone may be prepared by simmering $\frac{1}{2}$ pound of minced beef for two hours in one pint of water containing 20 grains of bicarbonate of sodium, allowing to cool to about 100 degrees F., digesting at this temperature with a tablespoonful of pancreatic extract for 3 hours, decanting and momentarily boiling.

(2). Another preparation may be made by chopping lean beef very fine and macerating it for about 6 hours in a solution of pepsin with water and hydrochloric acid at a temperature of about 100 degrees F. In this way the beef is mostly dissolved, the mixture is strained, and the solution may be combined with various medicines, as may be required. Sometimes an excess of pepsin and pancreatin are added, and the solution thus prepared is added to wines, elixirs and emulsions.

Some years ago M. Bernoux presented to the Societe de Pharmacie de Paris this formula for a new and palatable solution of peptone: Dry beef peptone, 50 to 100 grams; ground burnt coffee, 100 to 200 grams; saccharine, 2.50 to 5 grams. These ingredients are mixed with a sufficient quantity of water to make 1 liter. An addition of 5 to 10 per cent. of any alcoholic liquor (rum) may be made if desirable.

A syrup of peptone may be prepared by dissolving in the cold 5 grams of peptone and 60 grams of sugar in 30 grams of water and flavoring with 5 grams of tincture of orange peel.

Chicken Cholera.

(J. J. R.) see this journal, January 7, 1897, page 14. The following remedies and treatment have also been proposed: Take of crystals of carbolic acid, 2 ounces; hyposulphite of sodium, 2 ounces; dissolve in one gallon of water; add of this solution 1 or 2 ounces to the gallon of water that the fowls drink, or mix it in the same proportion in a mash made of ground grain or other food. This not only relieves when sick, but it is an excellent preventive. Chicken cholera can only be introduced by direct importation of the virus, either with fowls or by birds, rabbits or insects carrying it from neighboring farms. The virus is never carried through the air. When more than one fowl dies within a short period, cholera should be suspected. Separate the fowls as much as pos-

sible, and give restricted quarters where they may be observed, and where disinfectants may be freely used. If the peculiar diarrhoea sets in, kill the sick fowls and change the remainder to fresh ground. The infected excrements should be carefully scraped up and burned, and the enclosure thoroughly disinfected with a one-half per cent. solution of sulphuric acid, or a 1 per cent. solution of carbolic acid, which may be applied with a common watering pot. Burn the dead birds. The germs of the disease are taken into the system only by the mouth, and, therefore, the watering-troughs and feeding-places must be kept perfectly sweet by frequent disinfection with one of the solutions mentioned. Three weeks after the last case of sickness, the fowls may again be placed together in the disinfected run. Keep them, however, under observation for two or three months before allowing them again to roam over the old places.

Cholera Powder.

Ferrous sulphate	1 ounce
Capsicum	1 ounce
Black pepper	2 ounces
Calcium phosphate	8 ounces
Fennugreek	4 ounces
Sand	4 ounces

Reduce the ingredients to powder and mix. One teaspoonful to be given with the feed for a dozen fowls.

Chocolate Syrup.

(L. A.) We know of no satisfactory "short cut" in making chocolate syrup for the soda fountain. Good syrup can be obtained only when reliable materials are employed in its preparation, and, therefore, substitutes for chocolate or cocoa to lower the cost, are inadmissible. However, we submit several formulas taken from Hiss' "Manual of Beverages," which may be of service. In the following, where a certain amount of "chocolate" or "cocoa" is specified without naming the brand, it is stated that this amount may be advantageously increased in case of some "chocolates" or "cocoas" and, again, in others, may advantageously be reduced:

(1) Cocoa, soluble	2 ounces
Water	32 fl. ounces
Sugar	52 ounces
Vanilla extract	about 4 fl. drams

Triturate the cocoa in a mortar with a portion of the water, to a smooth paste, add the remainder of the water, then the sugar, heat the whole in a suitable vessel with constant stirring, until it nearly reaches the boiling point, then strain through a fine sieve, and when cold, add the vanilla extract.

(2) Chocolate, powder	4 ounces
Sugar	52 ounces
Vanilla extract	about 6 fl. drams
Water, boiling	24 fl. ounces

Mix the chocolate and sugar, triturate the mixed powders with the boiling water added slowly, and strain; when cool, add the vanilla extract.

(3) Baker's chocolate	8 ounces
Borax, powder	$\frac{1}{2}$ ounce
Boric acid, powder	$\frac{1}{2}$ ounce
Starch	1 ounce
Water	64 fl. ounces
Sugar	6 pounds
Vanilla extract	about 1 fl. ounce

Grate the chocolate, triturate with the borax, boric acid and starch, add slowly, with stirring, the water, bring to a boil, strain, allow to cool, and add the extract. The syrup may be enriched, if desired, by the addition of a can of condensed milk and the whites of two eggs.

(4) Chocolate, any good brand	4 ounces
Sugar, granulated	24 ounces
Water	48 fl. ounces

Put the chocolate in an enameled iron pot, and add to it about 8 av. ounces of sugar, stirring well with a porcelain pestle until all the lumps in the chocolate are reduced to powder and are well mixed with the sugar. Add the remainder of the sugar, mixing well. Heat the water to boiling, pour it on the mixture of chocolate and sugar, stir well with a wooden ladle, and boil the whole for a few minutes.

In dispensing, use about 3 fluidounces of this syrup and 1 fluidounce of cream to a 12-ounce glass. If cream, not cream syrup, is used, the sugar in the chocolate syrup should be increased $\frac{1}{2}$ to 1 pound. The addition of 2 fluidounces of glycerine and 2 ounces of starch, rubbed well with a cupful of water, before boiling, greatly increases the consistency ("body") of the syrup. Vanilla

Extract may be added ad libitum; about 1 fluidounce is the correct proportion. This syrup should not be kept in the dispensing cans of the soda apparatus, but in bottles of 2-pint capacity, shaking the bottles thoroughly when syrup is first drawn. By adding, before boiling, a can of condensed milk, to the syrup, no addition of cream is required. The addition of this milk, however, causes the cream to spoil quickly, and is, therefore, not advisable, unless the syrup is sold in 2 or 3 days. The full flavor of this syrup and its cheapness, allow the dispenser to be liberal with it.

Diamond Ink.

(A. C.) The so-called "diamond inks" are liquids used for etching glass. The most common method consists in mixing ammonium fluoride with precipitated barium sulphate and decomposing with sulphuric acid. Here is a formula:

- (1) Ammonium fluoride 1 ounce
Barium sulphate 3 ounces
Sulphuric acid, a sufficient quantity.

Rub the two salts together, transfer to a platinum, lead or gutta percha vessel, and add enough sulphuric acid to produce a cream-like paste. Apply with a quill or camel's hair pencil.

Dieterich gives the following:

- (2) Ammonium fluoride 2 parts.
Barium sulphate 2 parts.
Hydrofluoric acid, fuming, ... Sufficient.

Mix the salts in a porcelain mortar, transfer to a platinum or lead vessel, and by means of a platinum wire stir in enough of the acid to make a thin paste. Writing may be performed with a steel pen; allow the ink to remain on the glass for one-half hour, and then wash off with water. To make the etching more visible, rub in a little printers ink.

(3) Dissolve 18 grams of sodium fluoride and 3.5 grams of potassium sulphate in 250 cc. of water. Also, dissolve 7 grams zinc chloride in 250 cc. of water and add 32.5 grams hydrochloric acid. For use mix equal parts of the solutions. The time required for etching is one-half hour.

Hydrofluoric acid is an extremely dangerous substance to manipulate, and therefore great care should be taken in using any of the above preparations. The vapor of the acid, even when diluted with air, has a most irritating and injurious effect upon the respiratory organs, and if inhaled in the pure state it may cause death. The liquid acid is powerfully corrosive, and a single drop of it upon the skin causes the most painful ulcerated sores, accompanied, it is said, by distressing aching pains through the whole body.

A process for "embossing" glass with hydrofluoric acid, or "white acid," as it is sometimes called in the trade, may be found in this journal, February 24, 1898, page 295.

Cleaning Marble.

(J. J. R.) (1) Mix with water 5 parts of common soda, 2½ parts powdered chalk, and 2½ parts of powdered pumice stone. Rub the spots well with this mixture, then wash off with soap and water.

- (2) Sodium carbonate 2 ounces
Chlorinated lime 1 ounce
Water 14 ounces

Mix well and apply the mixture (magma and liquid) to the marble with a cloth, rubbing well in, and finally rubbing dry. It may be necessary to repeat the operation.

(3) The Era Formulary gives the following process for removing oil stains from marble: Apply common clay saturated with benzine. If the grease has remained long enough it will become acidulated, and may injure the polish, but the stain will be removed. The marble may then be washed with a solution of soft soap in water.

From Lippincott's "Book of Instructions" for the soda fountain, we take the following information relating to the cure of marble:

The action of acids, viz.: sulphuric, carbonic, citric, phosphoric, lactic, etc., or the fumes emitting therefrom, employed in carbonating and dispensing soda water, attacking marble, are very injurious to its polish; the front of the apparatus, marble slabs, etc., exposed to the

spattering of soda water in which one or more of these acids are present should be immediately rinsed with water and afterwards rubbed quickly with a clean, soft cloth until perfectly dry. Frequent applications of pure olive oil to black or fancy marbles, rubbed vigorously with a soft, smooth fabric, will assist toward retaining their original appearance. Under no circumstances should oil or soap be applied to onyx, Italian white, French blue or Bardillo marbles. Stone of this description should be washed frequently with pure water and afterwards rubbed briskly with a clean chamols until it assumes a glossy appearance.

A saturated solution of beeswax in turpentine, rubbed into the pores of highly colored marble showing signs of dimness, and afterwards removed by rubbing it smartly with a soft, smooth cloth, will restore its original lustre. Light colored marbles, and especially onyx, should be kept dry and bright by burnishing the surface frequently with a clean chamols. To prevent Belgium black marble from turning gray, it should be oiled and rubbed freely at least once a week. By keeping the pores of marble filled with oil, a film is formed over the surface which becomes almost impervious to the action of acids, etc.

BLEPHARIS CAPENSIS.—This South African plant is said to be a specific for anthrax (carbuncle). Dr. Blaine recommends it in the form of tincture every three hours during several days. (Ph. Post.)

CAUTION IN APPLICATION OF CARBOLIC ACID.—Since the introduction of carbolic acid in wound treatment and its undoubted success, which is also recognized by the general public, predilection of the laity for this remedy has steadily grown. While science has largely abandoned the antiseptic treatment of wounds for the aseptic method, and further a great number of practicing physicians have discontinued the use of carbolic acid, because of its toxic action, in favor of the more or less non-toxic substitutes (creolin, lysol, solvol, etc.), the lay public look upon it as a kind of panacea for all external injuries, and use it indiscriminately, without the knowledge that it must be used only when diluted to the proper strength, and then only for cleansing the wounds and for disinfecting the hands of the physicians and their instruments. Since carbolic acid is so readily obtained, it frequently happens that the most trivial wounds, even swellings from contusions, are mislabeled for days with more or less strong solutions of the acid. Aside from the danger of constitutional poisoning, which is particularly great with children, it has been observed only too often that gangrene resulted from the local application of the pure acid and even from aqueous 3 per cent. solutions. It is only when physicians will stop prescribing carbolic acid that it may be expected that the laity will discontinue its indiscriminate use on all occasions. (Dr. M. Kamm, in Ther. Monatsh., through Ap. Ztg.)

AMYLOLYTIC FERMENTS.—In an article on this important subject by Wyatt Winkgrae, M. R. C. S., Eng. (Assistant Surgeon to the Central London Throat and Ear Hospital), in the London "Lancet," May 7, 1898, we are informed of a personal necessity that arose in the writer's experience for a reliable starch digestant. A crucial comparative examination was therefore made of many malt extracts, and of Taka-Diastase, the tests being conducted both chemically and clinically. He summarizes briefly: 1. That Taka-Diastase is the most powerful of the starch or diastatic ferments and the most reliable, since it is more rapid in its action—i. e., "it will convert a larger amount (of starch) in a given time than will any other amylolytic ferment." 2. That Taka-Diastase seems to be less retarded in its digestive action by the presence of the organic acids (butyric, lactic, acetic), and also by tea, coffee and alcohol, than are saliva and the malt extracts. This is an important point in pyrosis. 3. That all mineral acids, hydrochloric, etc., quickly stop and permanently destroy all diastatic action if allowed sufficient time and if present in sufficient quantities. 4. That Taka-Diastase and malt diastase have, like ptyalin, no action upon cellulose (uncooked starch). All starch food should therefore be cooked to permit of the starch ferment assisting nature in this function.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

VOL. XIX.

NEW YORK, JUNE 23, 1898.

No. 25.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL..... 933	Drug Trade Section on
Benzinum, U. S. P..... 936	Stamp Tax..... 954
ERA COURSE IN PHAR-	Important Meeting of Job-
MACY..... 937	bers; Conference on
Close of First Year of Era	Shorter Hours; Drug
Course in Pharmacy..... 937	Clerk Sent to Prison for
Pharmaceutical Processes..... 937	Life; Proprietary Association
Experience with a Line of	Celebrates..... 955
Preparations Which Have	NEWS LETTERS..... 956
Successfully Replaced	BUSINESS RECORD..... 963
Patents..... 942	New York State Association;
Credulity Among Scientists. 944	Kings County Society..... 964
French Pharmaceutical	Minnesota Association..... 965
Pottery..... 944	American and Massachusetts
Thomas Henry and the	Associations..... 966
Origin of Artificial Mineral	Boards and Colleges..... 967
Waters..... 946	DRUGGISTS' ADVERTISING..... 968
PHARMACY..... 948	PATENTS..... 970
QUESTION BOX..... 950	OBITUARY..... 970
Remedy for Opium Habit. 952	STATE OF TRADE..... 971
NEWS AND TRADE DE-	MARKET REPORTS..... 972
PARTMENT..... 953	
War Revenue Law; Drug-	
gists Might Profit from	
These Suggestions..... 953	

THE ERA COURSE IN PHARMACY

Consists of lectures prepared by leading pharmaceutical educators, and published weekly in The Pharmaceutical Era. Quizzes and Examinations are conducted by mail. Question blanks upon each lecture are sent to students, and their answers duly rated are returned with corrections by the instructors.

The course is graded and covers in scope all the subjects included in the college curriculum. The course is divided into two years, junior and senior, of about 40 weeks each.

More than 1,000 Students in the junior class for 1897-98.

Send for Full Prospectus, now in preparation, giving details of courses, manner of conducting it and terms for tuition, etc.

Address,

THE PHARMACEUTICAL ERA.

Box 1483, New York.

The Time to Increase Prices.

The War Revenue Tax bill is now a law, and, with reference to those provisions which affect the drug trade, it goes into effect the 1st of July, only a week distant. Our news pages have fully advised the trade what are its provisions and what is to be done.

As we have frequently stated heretofore, the general effect of the stamp tax on proprietary medicines will be to raise their cost to the retail dealer, and he must either bear this increased price, or secure it from his customer. We have before suggested, and the sentiment is growing and is already very strong, that this is an opportunity afforded to the retailer which he cannot afford to neglect, to make a very general movement toward the restoration of prices on patent medicines, which have for so long been sold at cut rates.

A number of the most influential drug houses in the country have joined in heartily in this suggestion, and are urging their customers, by circular and through direct solicitation, to call meetings of retailers in various localities and make a determined, organized and uniform efforts to raise the retail selling prices of patent medicines, not only the amount of the tax placed upon them, but as much more as is deemed expedient, and in all cases as nearly approaching the regular, established, advertised price as possible.

Where full prices now prevail, it may be inexpedient for the retailer to add the cost of the stamp, and in fact we believe that such a fortunate individual will be perfectly willing to bear this very slight expense, but our suggestion applies to those localities, and they are very numerous, where the druggists have for years been selling patent medicines at a very meager margin of profit, and in many cases even none.

No more opportune time than this could be chosen to correct the cut price evil and to re-establish legitimate retail prices, and we wish to appeal most earnestly and emphatically to the entire drug trade of the United States to take advantage of this present opportunity to move in the matter. To the druggists we would say, lay aside all personal animosities, visit your brother druggist, talk over the matter with him, and together decide that you will do it. You may not be able to get full prices, but try to do so; get higher prices, anyway.

Go Thou and Do Likewise.

We have urged elsewhere that retail druggists take advantage of the present opportunity to raise their prices on patent medicines. It is very pleasant to be able to record that some of them have already done so. At a recent meeting of the Local Druggists' Association of Bridgeport, Conn., a schedule of prices was arranged, and similar action was taken by the retailers in Troy, N. Y. Let the example be contagious, and may there start an epidemic which shall affect the entire trade. If the druggists desire to hold the patent medicine business and make a profit out of it, now is the time and this the way.

The Parcels Post Question.

There is steadily and quite rapidly growing among the business men of the United States a movement to secure more reasonable carriage rates on merchandise sent by mail and express. What is termed the National Parcel Postal League is actively working in the matter, and desires the support of all interested.

It is complained that the rates exacted by the United States for this class of postal matter are highly excessive and much more burdensome than those of foreign countries, and, what is strangely inconsistent, we can send this class of matter to foreign countries cheaper than we can circulate it within our own boundaries. For instance, the rates for all kinds of merchandise sent from the United States to sixteen foreign countries are 12 cents per pound, limit of weight eleven pounds, while in the United States it costs 10 cents per pound, limit of four pounds.

In Great Britain parcels post rates are as low as 6 cents per pound, while a ten or eleven pound package costs but 39 cents. In fact, so reasonable are the postal rates abroad that express companies are unknown. The backers of the present movement ask very pertinently why our merchants should be subjected to such a heavy tax. Where the cheaper parcel post is in effect it pays the Post Office a big profit, and if experience is a good teacher, there is sufficient rejoinder in this statement to the contention of some that our Government cannot afford to do the work any cheaper. In England, particularly, a large profit is made by the government upon this class of service. Nor is this at all strange. The history of our own post office has been that with every reduction of rate upon whatever class of matter, the result has been such a large increase of business that the income of the department is very much greater, and there is every reason to believe that with reference to merchandise postage it would be a money-making venture on the part of the Government to grant what is asked for.

We heartily commend the objects of the National Postal League, and in doing so are but falling in line with hosts of business enterprises which are asking and should have this concession of cheaper rates on all kinds of merchandise. The question is one which could very properly receive the support of all pharmaceutical organizations, and especially those of the wholesale men and the manufacturers.

Mule Races and Scientific Papers.

At a recent meeting of the Illinois Pharmaceutical Association a number of interesting and valuable papers were presented. We are told, however, that when some of the best of these were under reading and discussion, the attendance was very small, from the fact that right outside the hotel a mule race was going on, attracting the attention of the audience and reducing it to a corporal's guard. Our informant believes that either the reading of papers at meetings or mule races should be dropped, as they do not agree, and it is hardly fair to ask men of prominence to prepare papers if mule races are the greater attraction. This little story points its own moral, and could be well left without farther elaboration or comment. It furnishes another argument in support of the contention that at our association meetings the programmes should be so arranged that business and pleasure should not be allowed to conflict; the one should not overlap the other. As to the relative merits of mule races and papers, various opinions are held. We must admit that there are times when a mule race is both more entertaining and more instructive than some of the papers which are presented, but

this is only an exception which proves the rule. It is decidedly unfair and discourteous to the authors of the papers and to the association itself, to allow the Entertainment Committee to present any attraction which may by any chance draw away the attendance of members from the sessions of the association at which it is their duty to be present. Fun is all right and a good thing, but it is not the prime object of pharmaceutical associations, though some of these bodies apparently think it is, if we may judge from the very meager business programme, and the long and complex entertainment list which they annually present to attract a large number of delegates. It is to be hoped that the Illinois Association will not hereafter be obliged to compete in the manner above indicated.

A Suggestion.

Whenever a person is feeling particularly out of sorts, there is intense comfort in knowing that the neighbors feel the same way. This observation is prompted by the memory of our doleful feelings during several years past over our consular service. We have been howling about reforming it, and have lain awake nights thinking how other nations were getting ahead of us.

We have been especially concerned over Germany, probably for the reason that that country just recently awakened in a commercial sense, and the person or nation who has just gotten out of bed and is feeling quite young, is more to be feared than the well and long established. At any rate, it is comforting to know that our German friends feel quite as badly as we do over trade matters. Some German industrial associations have discovered that our consular service is too good. Our consuls are too active and persistent in pushing American goods, and one of them has been openly burdened with the responsibility for flooding Germany with bicycles superior in design and construction to German models.

We are thus able to modify our views of the effectiveness of our consular service, and may candidly admit that some of the gentlemen who represent us abroad are happily afflicted with the genuine brand of American commercial insomnia. There are some of them who are versatile enough to tackle anything from a botanical specimen to a brick machine, and grind it through a literary mill until it emerges as an inspiring consular report.

But we can't quite give up the habit of reforming things. Now that the American trade camel has pushed head and shoulders into the foreign trade tent, what's the matter with the hump? If our consular service has done so well under criticism, what might it not do under more criticism?

In this connection we note a suggestion made by the Section of Foreign Markets of the Agricultural Department in the last issue of the year book. It is well known that military and naval attaches add grace, through gold lace and personal pulchritude, to our foreign legations and embassies, and the Section on Foreign Markets wants a lot of agricultural attaches. Without even pausing to worry about the personal appearance of some of our agriculturists at a foreign Court, we commend the idea, and would suggest a lot more attaches to represent all the great industries of the country.

It would surely be a profitable undertaking to have specialists in different lines observing the ways of foreigners, and watching for trade opportunities. A few trained chemists, mechanical engineers and technologists in textile, metal, mining, agricultural and transportation industries, would be valuable additions to the staffs now composed of military and naval ex-

perts. It is too much to expect one man in the person of a resident consul, even if he may be of the highest versatility, to intelligently report upon the finer details of industries, with which he is totally unacquainted. The political consul could still exist under this proposed arrangement as a figurehead to sign things, attend dinners, make speeches, etc. The industrial attaches could be secured in office under the protecting wing of the Civil Service Commission, and easily earn their keep by posting us on what the foreigner is making and how to make things for him.

Another Sure Cure for Consumption.

Consumption is one of the most dreaded and deadly diseases afflicting humanity. It is therefore natural that every one, high or low, ignorant or wise, should be interested in anything which promises to cure, or even alleviate this dreaded scourge. Because of our very hope, we are more the credulous, which explains why so many vaunted cures are announced, widely accepted, enthusiastically exploited, but all, alas, sooner or later to pass into oblivion, their claims for potency having been unsubstantiated. We are asked now to consider the claims of another cure, and a unique one, too, which appears to be a little better introduced and under more respectable circumstances than some of its predecessors, which have been little other than quackery.

At the recent annual meeting of the American Medical Association, held at Denver, a Chicago doctor delivered an address on "The Surgery of the Lungs," in which he described some experiments with his methods of treatment. It is the substance of his paper which has caused the publication of columns of newspaper reports. The author holds the belief that tuberculosis of the lungs has a tendency to cure itself if left to itself, in other words, if the lungs be kept quiet, immovable, the disease would quickly die out. But if one's lungs are kept without movement, it of course follows that life itself must cease. But this ingenious physician proposes to immobilize just that portion of the lung which is affected, and his method for doing this is decidedly original. He describes his theory and method of treatment somewhat at length, it being in substance as follows:

"It has been found by experiment by myself and others that the reason that a person is enabled to live and breathe with a large portion of the lung tissue gone is that the capability of the lung is fully ten times as great as the actual working surface. That is, there is nine times as much tissue in reserve as there is in actual use, and if a portion of the lung is removed, the remainder will expand and fill the pleural cavity, thus giving as much working surface as before. This I have demonstrated, first by experiments on dogs and afterward on humans.

"The sore spots in the cavities and on the tissues of the lungs, while in constant motion as in breathing, are prevented from healing just as any sore if constantly irritated will remain open. A sore on any part of the body would not heal if it were being continuously pulled apart. The tendency of the tubercular sore is to heal, and if left alone it will heal.

"The way to do this is by withdrawing the air. That the air can be withdrawn with safety is demonstrated pathologically in the treatment of pleurisy and other diseases in which air and fluid have been drawn off. The very best way to get this effect is by compressing the lung or placing pressure upon it. There are two ways of doing this. One is by removing the ribs and allowing the chest to collapse. The pressure of the side will prevent air from entering and prevent the spread of the disease. A far better way, and one which I adopted after much experiment, is the intro-

duction into the cavity of a gas. The best gas for the purpose is pure nitrogen, for, unlike air and oxygen, it has no effect on the tissues, and will not be absorbed. Air might remain in the cavity for a week or even longer, and then would find its way out by being absorbed, but the lung needs a longer rest than this, and nitrogen I find to be perfectly adapted to the purpose.

"I have been working on this subject for three years, but during the past year I have experimented practically with this method. I have tried it in five cases of advanced tuberculosis with unqualified success. As a result, I can say with safety that, unless the lung is entirely gone, a permanent cure can be effected. The action of the nitrogen compresses the lung and gives it an entire rest. The nodule of the tuberculosis becomes cicatrized or scarified into a solid substance and the tissue builds up around it.

"In the five cases which I have used this treatment, cure was effected in from four to eight weeks. The nitrogen treatment is exceedingly simple. It consists mostly of introducing a hypodermic needle through which nitrogen is injected. The needle is supplied with a stopcock, by which the amount introduced can be regulated. There is a sensation of short breathlessness for a few moments in some cases, which immediately disappears, and in every case is followed by relief, perhaps the first time in years. This is particularly noticeable in the absence of the tickling sensation which causes the patient to cough, and the cough disappears immediately. The patient is in no way affected; is not required to take to his bed, and can continue his usual business without inconvenience. At the end of a few weeks, the nitrogen is withdrawn and air admitted, and the lung expands to its usual dimensions. If the cough returns, put in more nitrogen and give the lung another rest, which will surely cure it."

We confess we hardly understand just the practical application of all this; how the air can be drawn out of a man's lungs by using a hypodermic syringe, nitrogen pumped in to take its place, and then the lung sealed up and kept from expanding and contracting in unison with the other lung, is a matter beyond our lay apprehension, but perhaps the doctor knows how to do it. We are willing to believe it all until we are forced to believe otherwise. We cannot overcome the habit of being sanguine whenever a new cure is announced, and so with this case, but we are very careful to neither commend nor condemn, but merely wait for developments.

At last week's meeting of the Drug Trade Section of the New York Board of Trade and Transportation there was offered a resolution to the effect that the manufacturers of proprietary medicines and the wholesale distributors thereof agree not to raise their prices on account of the imposition of the revenue stamp tax. There was no very positive expression of opinion upon this proposition, for of those present, as the little boy would say, "Some were afraid and the others didn't." No one seemed to want to go on record, and the proposition was not supported. Individual manufacturers of proprietary medicines are acting in accordance with their individual desires and opinions. Some will raise their prices, others will not, though the latter class will be more numerous than appeared probable a short time ago.

Inasmuch as the rate of taxation is materially smaller than that first proposed, quite a number of proprietors who had expected to raise prices have decided not to do so; a move by which they assuredly will not lose anything in the favor of the retailer. The proposition that no one should raise prices seemed, however, to be too radical for support, and, as stated, it was voted down at the meeting under notice.

BENZINUM U. S. P.*

BY EDWARD KREMERS.

Several years ago the writer had occasion to compare several statements given under the above title in the United States Pharmacopœia of 1890, with the facts that might be deduced theoretically from data found in works on organic chemistry. The comparison immediately revealed discrepancies, which were more recently verified by actual experiment.

The Pharmacopœia defines benzinum or petroleum ether as "a purified distillate from American petroleum, consisting of hydro-carbons, chiefly of the marsh-gas series (C_2H_4 , C_2H_6), and homologous compounds." The fourth paragraph reads: "Specific gravity, 0.670 to 0.675 at 15° C. (59° F.); the fifth: "Boiling point, 50° to 60° C. (122° to 140° F.)."

How a person is to distinguish between a petroleum ether obtained from American petroleum and another obtained from a petroleum of a different nationality does not become evident. In what sense the term homologous is used, it is also difficult to understand, unless the definition is to read as follows: "Consisting chiefly of the paraffin hydrocarbons¹ of the pentane (C_5H_{12}) and hexane (C_6H_{14}) groups and their homologues."

As far as the writer is aware, petroleum ether is obtained exclusively by fractional distillation. What the Pharmacopœia evidently wants is that fraction of American petroleum which passes over between 50 to 60° in the process of purification by distillation.

Inasmuch as the hydrocarbons constituting American petroleum are supposed to consist principally of the normal members of the respective groups, for the sake of simplicity, normal pentane and hexane only need to be considered in this connection. Normal pentane boils at 37° and has a sp. gr. of 0.627. Normal hexane boils at 69° and has a sp. gr. of 0.658. Their isomers have correspondingly lower boiling points, but higher specific gravities, the highest one recorded being 0.677.

From these data the improbability becomes apparent that a mixture distilling between 50° to 60°, whatever the proportion of pentane and hexane may be, should have a sp. gr. as high as the lower limit required by the U. S. Pharmacopœia. As already stated, actual experience has verified this supposition.

A commercial sample of petroleum ether, which had evidently been imported by the chemical dealer from whom it was purchased, was fractionated carefully with a two-bulb column. From about three-fourths of a liter about two-thirds came over below 50°, and most of the remaining third between 50° and 60°. The sp. gr. of this fraction, when determined with a Mohr-Westphal balance was found to be 0.658 at 20°.

In a second experiment, about 418 grams out of 440 grams came over below 50°, and only about 15 grams between 50° and 60°. The sp. gr. of this fraction was found to be 0.657.

When petroleum ether was called for in a number of drug stores, higher boiling commercial articles, as a rule gasoline, were obtained. Yet upon fractionation a fraction between 50° and 60° was obtained, which, with one exception, had a lower sp. gr. than that required by the Pharmacopœia, though as a rule the bulk of the article could not even be distilled from a water-bath. In that one instance the distillation had been conducted very slowly.

The fact that an error of this kind, insignificant as it may be regarded, could escape attention during the ten years when the sixth edition was in force, and during another half decade since the seventh edition is in use, is in itself significant. The error in the sixth edition evidently was copied without question or experiment into the seventh. Neither do our American commentaries call attention to the mistake, although one of them gives the sp. gr. of pentane and hexane.

The Swiss Pharmacopœia² has adopted the same fraction, viz., 50°–60° American petroleum, under the name of "Ether Petrolei." The sp. gr. given is lower, viz., 0.660 to 0.670, and, therefore, allows of a range as wide again as that of the U. S. P. Both the lowering of the

sp. gr. and the wider range are an improvement over the U. S. P. requirements. The only objection that might be raised against the minimum figure is that it is not low enough.

The test for benzene has been the same for two revisions, and no one seems to have found fault with it. When tried with petroleum ether, to which 20, 40, 60 and 80 per cent, respectively of benzene had been added, no odor of nitro-benzene was obtained, but in all cases crystals of odorless dinitro-benzene were formed. The directions for this test given in the German and Swiss Pharmacopœias differ from the U. S. P. test principally in the much smaller amount of sulphuric acid to be used.

Attention was called above to the significance of the fact that these errors should have escaped attention for fifteen years. If to this is added the experience of the writer, who, during more than seven years of laboratory instruction has not been able to obtain a single specimen of petroleum ether from the drug stores, and has had difficulty in finding something that approximated it by ordering it from dealers in chemicals, it would seem to indicate that the paragraph on petroleum ether in the Pharmacopœia is dead and buried. Should this article be retained, nevertheless, in the next edition of the U. S. P., the necessary corrections ought to be made, based upon more experimental evidence than is at hand at present.

ACTION OF CAUSTIC SODA SOLUTION ON WOOL.

It is a somewhat widespread, but erroneous, supposition that wool is attacked and readily destroyed by dilute and strong solutions of caustic soda. As a matter of fact, wool is affected not at all, or very little by strong solutions within a given time, but very much more so by dilute solution in the same length of time. Up to a concentration of 20° B. (1.19) the destructive power of the lye increases with the concentration, then decreases gradually with further increase of strength, and at 42° B. (1.44) the wool even increases in firmness. Only a prolonged contact with this strength 30 minutes or more slightly injures the wool. An addition of glycerin prevents injury to the wool to a certain degree with weak solutions; with strong solutions it augments the firmness of the wool fiber. (Chem. Centbl., through Südd. Ap. Ztg.)

News dispatches tell us that Dr. Frederick F. Siddall, of Chicago, has confessed his evil deeds in connection with the bogus medical institutions (under various names), which have been selling so-called diplomas to any one willing to purchase. He admitted that he had disposed of many diplomas, but said that the business had fallen off lately, and he further confessed that the signatures of several doctors (imaginary individuals), appearing on these diplomas had been written by him. This is the individual who, under various aliases and in connection with various institutions, has been exposed in this paper a number of times. Bogus pharmacy diplomas were a portion of his scheme, and a few of these have turned up before our boards of pharmacy. Secretaries of boards should be on the alert, and discover and refuse all questionable diplomas and certificates, particularly those emanating from Chicago.

We can hardly believe it true, though willing and anxious to, that the white-winged dove of peace has at last settled upon the retail drug fraternity of Denver, and that the cut-rate drug war is ended, or about to end. We may be a little premature, but we are told that the thorn of irritation has been plucked out, and that the wound will now heal and the system recover. To abandon hyperbole and metaphor, and descend to common, every-day English, the cut-rate drug firm in that city which has caused all the trouble has been bought out, and the druggists have come to the conclusion to restore prices as far as it is possible, and will work in harmony to this end. We sincerely hope we will not be obliged to contradict this announcement.

*Report of Com. G., U. S. P. Revision; (Pharm. Rev.)

¹Marsh-gas Series.

²Duennenberger: Commentar zur Pharmacopœia helvetica, p. 34.

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblentz, A.M., Ph. M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Wilber G. Compner, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Phm. B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M. D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college, for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 27, 1898; the second term began February 17, 1898, and will end June 30, 1898. The Junior class for 1897 is now closed.

FEES. The entire expense is only \$7.75 per annum, and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

CLOSE OF THE FIRST YEAR OF THE ERA COURSE IN PHARMACY.

With Lecture No. 82 on the "Art of Percolation," by Prof. J. U. Lloyd, the first year of the Era Course is brought to a close. Professor Lloyd is the greatest living authority upon the subject of percolation, and his lecture, which exhibits the same pleasing style and the same talent of description that characterize his widely known literary productions, forms a fitting close to the first series of lectures.

In many respects the year has been noteworthy. The interest awakened by the Era Course and the number of students enrolled have far exceeded the expectations which were entertained at the inception of the course. The lectures have generally been of an excellent character, and the enthusiasm exhibited by the students, as well as the genuine advancement which their recitations have evidenced, have been a constant cause for congratulation. There has been no cheap bidding for popularity by proposing to give the student an education without an earnest effort on his part to obtain it. At all times it has been maintained that the only true education is that which is obtained through unremitting, honest effort.

The object of the Era Course has been, and will continue to be, to assist earnest students to a sound and true education in pharmacy, to prepare them to meet and to cope with the difficulties of their profession, and to enable them to become successful pharmacists. For those who obtain such a preparation a Board of Pharmacy examination can have no terror.

The Era Course does not promise its members immunity from work. On the contrary, it promises them

hard study, and plenty of it, believing that the young men and women who are entering pharmacy understand that an education cannot be purchased ready made, like a bale of merchandise, and they have the good sense to perceive that those who propose, for a consideration, to give the student a trolley ride through the Board of Pharmacy have a greater interest in the contents of his pocketbook than they have in his future welfare.

The second year of the course will open with the first issue of the Era in September, when both junior and senior classes will begin. Each class will receive separate lectures, with separate recitations upon the same.

As previously announced, the senior lectures will be devoted mainly to the branches most nearly allied to practical pharmacy, while the junior lectures will be devoted, as heretofore, to the consideration of general scientific subjects, but with the introduction of a number of improvements which have been suggested by the experience of the past year, and which it is thought will add greatly to the usefulness of the course and materially reduce the labors of the students in certain directions.

It is hoped that the fall term will begin not only with a large and enthusiastic junior class, but that a majority of the present members of the course will be enrolled in the senior class. All who expect to enroll in either class should notify the publishers of their intention at an early date in order that proper preparation can be made in time and delay avoided in sending out recitation blanks when the course opens.

A new and complete prospectus is now in preparation and will be sent to all who apply for it.

LECTURE NO. 81.

Pharmaceutical Processes.

Separations Accomplished With the Aid of Heat.

When heat is applied to a mixture of substances which differ in volatility, the more volatile are driven off in the form of vapor, while the less volatile are left behind. (Either the vaporized portion, or the unvaporized residue, or both, may be the object of the operation.)

This method is applicable only when the mixed substances have different vaporizing points, since if they were equally volatile, they would all vaporize together when heat was applied, and there would be no separation.

The principal separations accomplished in this manner, named partly from the nature of the substances involved, and partly from the degree of heat employed, are as follows:

When the object is to completely deprive a solid of its moisture and obtain it in the dry state, the process is known as Desiccation or Exsiccation.

When a dry organic solid is heated until a part or all of its volatile constituents are decomposed and driven off, the process is termed Torrefaction or Carbonization.

If the temperature is raised sufficiently to not only drive off all volatile constituents, but to cause the combustion of any remaining solid carbon, it is known as ignition.

When the process is applied to free a liquid from a more volatile liquid which dilutes it, or to obtain a solid residue, it is termed Evaporation.

If the object is to obtain the vaporized portions by conducting them into suitable vessels where they are subjected to refrigerating influences and condensed, the process is known as Sublimation or Distillation.

Desiccation and Exsiccation.—These terms are applied to the process of depriving a solid of water or other liquid by the application of heat insufficient to cause decomposition. The processes differ only in the nature of the substances to which they are applied.

Desiccation is generally applied to the process of drying green vegetable drugs, and may be accomplished either by exposing them directly or indirectly to the heat of the sun, or by the use of artificial heat in a drying chamber.

If in the form of thick or fleshy roots, the drugs should first be comminuted by slicing transversely. In the case of green, herbaceous drugs, the color is best preserved by avoiding the light, especially the direct rays of the sun. In all cases the drugs should be thinly spread on absorbent or perforated surfaces, as wire netting, and frequently turned. If these precautions are omitted, the drug is liable to mould, or to undergo a sweating process which not only discolors it, but may injuriously affect its valuable constituents.

When artificial heat is employed care must be taken to avoid a temperature that will volatilize or destroy active principles. In most cases the temperature should not be permitted to rise above that of a warm summer day.

When the substance is a salt containing water of crystallization which is driven off by the heat, the process is known specifically as exsiccation, and is used in the preparation of dried ferrous sulfate, dried alum, etc.

The salt having been placed in a suitable vessel, as an iron dish, heat is applied and very gradually raised until vapors cease to be evolved, and a residue of dry powder remains.

If the substance be heated too suddenly at first, the salt will melt in its water of crystallization, and subsequently form a hard cake or mass, or if stirred until the end of the operation, will form small lumps or grains. It is this last form of exsiccation which is commonly known as Granulation.

Torrefaction and Carbonization.—When the heat applied to a vegetable substance is sufficient to partially decompose and drive off its volatile constituents, as in the roasting of coffee and the parching of corn, the process is denominated Torrefaction.

An example of the pharmaceutical use of torrefaction is seen in the preparation of the once popular, but now rarely used, torrefied rhubarb. On roasting, the rhubarb loses its cathartic properties, but retains its astringency unimpaired.

If the temperature is sufficient

to completely drive off the volatile matters, leaving only the solid carbon and inorganic constituents behind, the process is known as Carbonization.

In carbonization the air must be excluded, or its admission carefully regulated, otherwise the solid carbon will ignite and be consumed.

Ignition.—Ignition is a general term applied to any process of strongly heating a substance in the air until all of its organic matter is consumed or

and leave an inorganic ash it is usually denominated Incineration. When applied to inorganic matter, as the oxalates and carbonates of the alkaline earths, so as to drive off carbon dioxide, or other gas, and leave behind a calx or lime, it is commonly known as Calcination.

Ignitions are required mainly in analytical processes, and are conducted in small, cup-shaped vessels known as crucibles, made of porcelain, plumbago, platinum, silver, etc., and heated by means of a blast lamp. (Fig. 52.)

When a precipitate is to be ignited, it is thoroughly dried, removed from the filter paper, and the latter incinerated, at first being heated gently to drive off volatile matters, and then heated strongly to consume the solid carbon. The precipitate is then added to the filter ash, and the whole heated from dull redness to a white heat, according to the nature of the substance being operated upon.

Evaporation.—Evaporation is the exposure of a solution to natural or artificial heat until its more volatile portions are vaporized, leaving a solid residue or a less volatile liquid behind. Like the previously named processes, the object of evaporation is to obtain the non-volatile or less volatile substances of the mixture, the remainder being permitted to escape into the atmosphere and waste.

The vessels employed in evaporations should be broad and shallow, since this shape exposes a large extent of surface to the source of heat and to the air, and facilitates the escape and dispersion of the vapor formed, all of which factors increase the rapidity of the process.

The vessels most commonly employed for the purpose are the common evaporating dishes or capsules of the laboratory, which are shallow dishes with rounded bottoms and a lip at one side for emptying. They may be of porcelain, of iron covered with porcelain, of the glazed ware known as granite or agate ware, or of silver, nickel, or platinum.

The porcelain dishes are best adapted to pharmaceutical purposes, their principal fault being their liability to fracture. They should always be protected from direct contact with the flame by a sand or water bath, wire gauze or asbestos board, and on removal from the fire should be placed on some badly conducting surface, or on straw or rubber rings, known as grommets, until cold.

The porcelain-lined and granite dishes are less liable to fracture than the porcelain, but the glaze has a disagreeable habit of scaling off, leaving the iron exposed.

The metallic dishes named above are used mainly in analytical operations, for which they are especially adapted, the principal objection to their pharmaceutical use being their expensiveness.

A very convenient form of capsule is that known as a Casserole, which is of porcelain, deeper and thicker than the ordinary evaporating dish, and having a handle, like a dipper. Casseroles are commonly of small sizes, half a liter or under, and therefore available for small operations only.

Surface Evaporation.—It is a familiar fact that nearly all liquids if left exposed to the atmosphere will in time volatilize and disappear. Even such liquids as mercury can be proved to slowly volatilize at common temperatures.

This evaporation is known as Surface Evaporation, since it takes place only from the surface instead of from within the body of the liquid, as in ebullition.

Evaporation from the surface is increased by the following circumstances: by raising the temperature of the liquid, by increasing the extent of surface exposed to the air, as by stirring or using shallow vessels, by frequent removal of the air above the liquid as it becomes saturated with vapor, and by raising the temperature of the atmosphere and thus increasing its capacity for moisture.

Evaporation by Ebullition or Boiling.—When vapor is disengaged in bubbles which form at the bottom of the vessel or within the body of the liquid, the phenomenon is known as Ebullition, or boiling. Surface evaporation goes on at the same time with boiling, but is distinct from it.

The rapidity of boiling is influenced mainly by the intensity of the heat and the extent of surface exposed to the fire. It may be performed in any of the vessels al-



Fig. 52.—Conducting An Ignition.

all of its volatile matter expelled.

When the process is applied to vegetable or animal matter so as to completely burn away the solid carbon

ready named under surface evaporation, but it is not so important that the vessel expose a broad surface of liquid to the air. It is advisable, however, that the evaporating vessel do not have a long, narrow neck, as this tends to cause a condensation and return of part of the vapor to the liquid.

As in surface evaporations, the manner of applying the heat, whether direct or by means of a bath, depends upon the nature of the substance treated, and the same precautions are observed to prevent fracture of the vessels employed.

As every bubble of steam in forming must overcome both the weight of the liquid above it and of the atmosphere resting upon the liquid, it follows that ebullition cannot occur until the vapor tension, i. e., the expansive force of the disengaged vapor, is equally great. The boiling point, therefore, will be raised or lowered as the atmospheric pressure is increased or decreased.

Vacuum Apparatus.—It is upon the last named principle that the vacuum apparatus of manufacturing pharmacy is based, whereby atmospheric pressure upon a liquid is reduced, and its boiling point correspondingly lowered.

The usual form of vacuum apparatus is a more or less spherical copper vessel, heated by steam and connected by a pipe from its dome-like portion with a powerful pump, by means of which the vapor can be removed as fast as formed, and the pressure inside the vessel reduced to any desired point. (Fig. 53.) By the use of this apparatus liquid extracts of vegetable drugs can be boiled

is passed, or by means of a stream of cold water, the latter being the most common method. When water is employed as the means of condensation, it is always caused to enter the condensing apparatus at its lowest point and is drawn off at the top, since the water as it becomes heated decreases in density and naturally rises to the upper part of the condenser.

Pharmaceutically several varieties of distillation are recognized, the distinctions being based either upon the character of the substance to which the process is applied, the nature of the changes which take place in the substances during the operation, or upon the character of the distilled product.

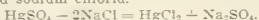
Sublimation.—Sublimation is the term applied to distillation when the substance operated upon and the distilled product are both solids.

Examples of sublimation are seen in the operations of purifying such substances as iodine, camphor, sulfur, etc., from the earthy or non-volatile matters with which they are contaminated. The mixture of volatile and non-volatile materials having been placed in a suitable vessel, heat is applied, and the vaporized portions conducted into another and colder portion of the apparatus, where they are condensed. The condensed product is known as a sublimate.

The condensation and deposition of the sublimate may take place in the upper part of the chamber in which the vaporization occurred, if the temperature of this part be sufficiently low, or it may be conducted into a separate vessel and there condensed.

The character of the sublimate, whether in powder form or in dense crystalline masses, depends in a great measure upon the rapidity with which the vapor is condensed. If condensed rapidly, as by conducting the vapor directly into a well cooled chamber, the sublimate will fall in a fine crystalline condition, but if condensed slowly, as in the upper part of the subliming apparatus, where the temperature is not much below the vaporizing point of the substance, it will form a hard, crystalline mass.

Sublimation may be accompanied by chemical reaction, as for example, in the manufacture of corrosive sublimate by subliming a mixture of mercuric sulfate and sodium chlorid.



When heat is applied, the volatile mercuric chlorid forms and is sublimed, while the non-volatile sodium sulfate remains behind.

Destructive Distillation.—Destructive distillation is the heating of animal or vegetable matter in closed vessels until it wholly or partly decomposes, the vaporized portions being condensed and collected.

The most common example of destructive distillation is the manufacture of illuminating gas from coal. The coal, which is fossil organic matter, is placed in closed iron vessels, or retorts, heated by means of fire placed under them. Under such circumstances the coal decomposes into volatile liquids and gases which are conducted away through pipes to be purified and collected, while the solid or non-volatile portions remain behind in the form of coke.

Distillation of Liquids.—The distillation of liquids, or distillation proper, consists of the successive vaporization of a liquid and the condensation and collection of the vaporized portion in another part of the same apparatus, the vaporization usually being accomplished by the application of heat, and the condensation by refrigeration or withdrawal of heat. The liquid obtained by condensation is known as the Distillate. The residue left in the still may consist of a solid which was dissolved in the original liquid, or of a non-volatile or less volatile liquid than the distillate.

When the process is employed for the separation of several liquids which differ in volatility it is known as Fractional Distillation, or simply as Fractioning. When a mixture of liquids having different boiling points is sub-

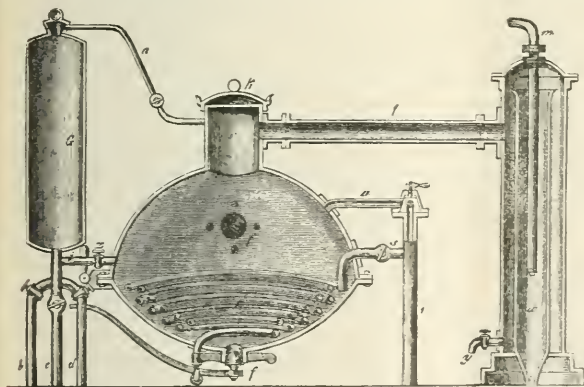


Fig. 53.—Vacuum Apparatus.

at comparatively low temperatures, and their concentration accomplished rapidly and without injury to their active principles.

Distillation.—Distillation is a generic term which may properly be applied to any process of separation by the use of heat in which the vaporized portions, instead of being permitted to escape into the atmosphere, are condensed and collected.

The vaporization may be accomplished either by the application of heat or the withdrawal of atmospheric pressure, and the condensation by the withdrawal of heat or the application of pressure. The application and withdrawal of heat are the means usually relied upon in pharmaceutical distillations.

The Still, or apparatus in which distillation is conducted, consists of a "still body," or vessel in which the substance is vaporized, connected in a suitable manner with another vessel or combination of vessels in which the condensation is accomplished. The chief points of difference in the many varieties of distillatory apparatus which have been devised are mainly in the construction of the condenser, and in its connection with the still body.

The heat used in distillation may be applied as in ordinary evaporations, either directly or by means of a water, steam or other bath. The condensation may be produced either by the cooling effect of the atmosphere upon the portions of the apparatus into which the vapor

jected to heat, the liquid having the lowest boiling point passes over first, accompanied by small portions of the other liquids. When all of the first liquid has distilled over, as shown by a considerable rise in the thermometer, the first receiver is removed, and another placed in its stead, and so on. As a result of this change of receivers, the original liquid will have been divided into a number of fractions, each consisting mainly of one liquid, with comparatively small amounts of the other liquids mixed with it. By resubmitting each of the original fractions to one or more new distillations, there is obtained at length a set of liquids having definite boiling points, and therefore practically pure.

Vacuum distillation is where the condenser is connected with an apparatus for reducing the internal pressure, whereby the liquid is caused to boil at a lower temperature. It is practically the same as the vacuum evaporation already described, and accomplished by the same mechanical means, being known as distillation when the volatile products are condensed and collected, and as evaporation when they are allowed to waste.

Retort Still and Condenser.—The simplest form of distillatory apparatus used in pharmacy is the retort and receiver (Fig. 54), a lineal descendant of the alembic of the old alchemists.

The form of the retort is sufficiently shown by the illustration, consisting essentially of a round bottomed flask with a long, tapering neck bent at an acute angle with the body. Retorts and receivers may be either



Fig. 54.—Retort Still and Condenser.

plain, or tubulated, i. e., have stoppered tubulures or openings through which liquids may be introduced or withdrawn, or to serve as the means of introducing funnel—or safety—tubes, or thermometers.

A funnel-tube is simply an ordinary funnel with a long neck. A safety-tube is a funnel-tube with a bend and bulb, containing mercury or other liquid, the liquid in the bulb or bend acting as a trap to prevent the escape of vapor, and as a safety valve which will be blown out through the tube before the pressure becomes great enough to endanger the safety of the apparatus.

The liquid to be subjected to distillation having been placed in the retort, heat is applied to the latter, either directly or by means of a bath, and the vapor condensed either in the neck of the retort or in the receiver. Condensation may be aided by immersing the receiver in a refrigerating mixture, as cracked ice, or ice and salt, or by the simple expedient of wrapping a cloth about the neck of the retort and permitting cold water to trickle slowly over it.

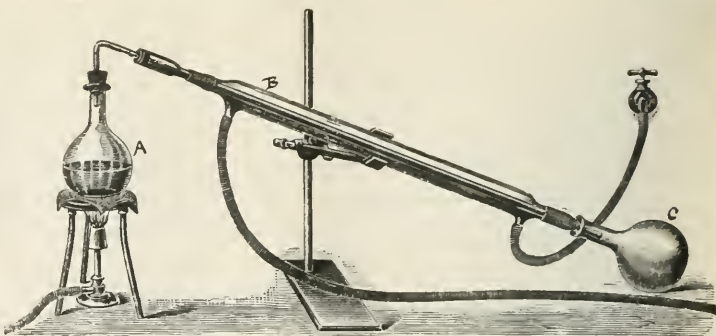


Fig. 55.—Flask Still and Liebig Condenser.

The greatest defect of the retort is the imperfection of its condensing power, especially where very volatile liquids are dealt with, in which cases, or where large quantities of liquid are to be distilled, some of the succeeding forms of still may be preferable.

Flask Still with Liebig Condenser.—In this form of apparatus the body of the retort is replaced by an ordinary chemical flask of thin glass, and the neck of the retort by a condenser of simple construction, known as Liebig's condenser. (Fig. 55.) The advantages of this apparatus are its simplicity of construction, the readiness with which the flask may be replaced when broken, and the excellence of its condensing power.

In its simplest form the Liebig condenser consists of a narrow tube connected at one end with the distilling flask and at the other with the receiver, and surrounded by a tube of larger caliber through which the cold water employed for condensing is caused to flow, passing in at the lower and flowing out at the upper end, or next the flask.

As seen in chemical laboratories, the condenser is commonly constructed of glass, but may be of other materials, preferably of block tin for the inner and copper for the outer tube.

When larger quantities of liquids are to be distilled than can be conveniently manipulated in a retort or distilling flask, as in the preparation of distilled water, some one of the many forms of pharmaceutical still are employed, several of the more useful of which are described in the succeeding paragraphs.

Remington Still and Condenser.—The most noteworthy feature of this valuable distilling apparatus is the peculiar construction of the condenser, which is, in effect, a compound Liebig's condenser, since it consists of a number of small, straight tubes enclosed in a larger outer tube or jacket, the latter serving to carry the cold water used in condensing while the inner tubes are connected with the still-head and conduct away the vapors to be condensed.

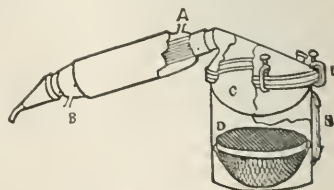


Fig. 56.—Remington Still.

(Fig. 56.) The advantages of the combination are the large extent of condensing surface contained within a small space, and that the condensing tubes being short and straight are easily cleansed.

Other valuable features of the Remington still are the shape of the still-head, which is brought sharply to one side to reduce condensation within the still, the easy detachability of the still-head, condenser, and body, and the

water level at the side by means of which the amount of liquid in the still may be observed.

The material of the still is tinned copper, except the condensing tubes, which are of block tin. With the still there is supplied a nicked evaporating dish which may be placed inside the still, the body of the latter then serving as a water bath, and a tinned wire cage in which vegetable substances may be enclosed when subjected to distillation. The object of the latter precaution is to prevent empyreuma, or the smoky odor or taste which liquids distilled from vegetable substances always possess if the solid comes in direct contact with the heated sides of the still.

Pharmaceutical Still with Worm Condenser—One of the oldest and most familiar forms of the pharmaceutical still is constructed in the form of a retort with detachable head and neck, the latter at its smaller extremity being connected with a condensing worm. (Fig. 57.) The con-

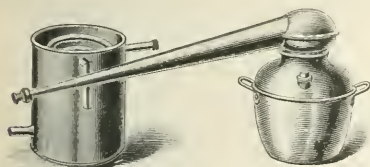


Fig. 57.—Still With Worm Condenser.

densing worm is simply a long tube coiled in a spiral for economy of space, and passing through a cylindrical vessel through which cold water is permitted to flow.

The object of the detachable head is to admit of easy access to the still body. A separate opening closed by a screw stopper permits the use of a thermometer or funnel-tube and the admission of fresh liquid without disconnecting the parts.

Stills of this pattern are usually made of sheet copper, and are reasonably cheap and lasting. They are especially valuable for the production of distilled water, and require only a moderate amount of cold water for condensing purposes.

Pharmaceutical Stills with Dome Condensers—In another class of pharmaceutical stills the upper part of the still, or the still-head, is more or less expanded into a dome, which

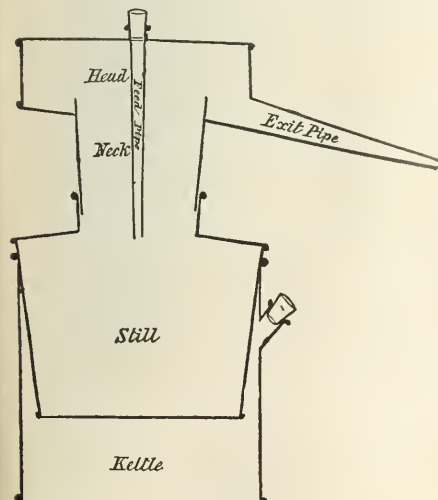


Fig. 58.—Wiegand's Still.

serves as the condensing surface, and may be cooled simply by contact with the atmosphere, or by a surrounding cylinder of cold water. The condensed liquid is col-

lected by one or more rims or gutters in the inside of the dome, and is drawn off by a short spout at one side.

In effect these stills are modified forms of the alembic, since the condensation is performed exclusively in the upper part of the still, and not in a separate condenser outside.

One of the simplest stills of this kind is known from its inventor as Wiegand's (Fig. 58), the condensation in this pattern being due solely to the cooling effect of the air upon the upper part of the still. In another form, manufactured by Whitall, Tatum & Co., the dome is surrounded and cooled by a cylindrical vessel in which cold water is placed. (Fig. 59.) The construction of both stills is sufficiently plain from the illustrations.

For a description of the numerous other forms of distilling apparatus, and the method of their employment, the student is referred to the larger manuals of pharmacy, or to the manufacturers' catalogues.

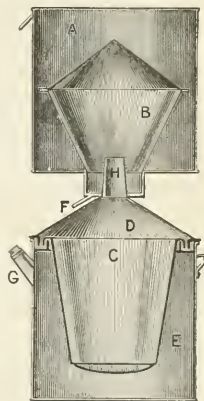


Fig. 59.—Whitall, Tatum & Co.'s Still.

SEPARATIONS BY MEANS OF SOLVENTS.

In numerous instances, especially in the case of solid drugs and mixtures of solid drugs, the valuable constituents can not be separated from the undesirable portions by the various processes already considered, but can be removed by the use of appropriate solvents. For example, the larger portion of an ordinary dry vegetable drug consists of woody and inert matter, with only a comparatively small amount of active constituent. By treatment of the drug with an appropriate liquid solvent, the soluble matters can be dissolved out, while the insoluble and undesirable portions are left behind.

To designate this method of separating substances by the use of solvents, the term *Extraction* is employed, and is applicable to all processes whereby substances are separated from each other by means of their differences in solubility.

Extraction may be combined with or carried on in connection with any of the other separatory processes previously described. For example, the solvent after saturation with the soluble constituents of a drug may be removed from the solid portions by expression, while the expressed liquid may be filtered, evaporated, or distilled.

Several varieties of extraction are recognized, differing from each other either in the character of the substances to which they are applied, or in the particular manner of their application, the most important of which are *lixivation*, *maceration*, *digestion*, *infusion*, *decoction* and *percolation*.

Lixivation—This is the term commonly applied to extraction when the substances treated are inorganic, as, for example, the leaching of wood ashes in the manufacture of lye, the extraction of sodium carbonate from black ash in the alkali industry, or the dissolving out of native borax from the earthy matters with which it is mixed in the so-called borax lakes, etc.

From the foregoing it is evident that lixiviation is not a particular kind of extraction, but simply extraction applied to inorganic mixtures.

Maceration—Maceration is the subjection of a drug or mixture of drugs to the prolonged action of a solvent, the process usually being conducted in a closed vessel. The process may or may not be accompanied by agitation, or shaking. Examples of the official use of maceration may be seen in the manufacture of certain tinctures which are directed to be made by macerating with the proper menstruum, in a closed vessel, for seven days, with occasional agitation, and final filtration.

If the vessel in which maceration is being conducted is

not subjected to agitation, that portion of the solvent which is in immediate contact with the drug will quickly become saturated with soluble matter, and its further action upon the drug prevented. By frequent agitation this saturated portion is diffused throughout the whole liquid, and the drug brought into contact with fresh solvent.

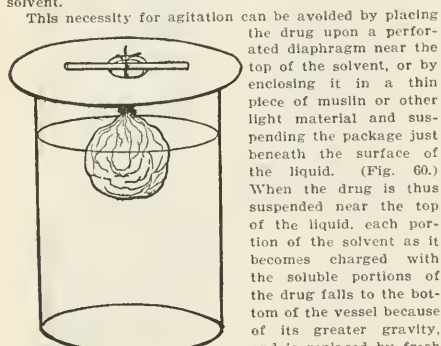


Fig. 60.—Circulatory Displacement.

This necessity for agitation can be avoided by placing the drug upon a perforated diaphragm near the top of the solvent, or by enclosing it in a thin piece of muslin or other light material and suspending the package just beneath the surface of the liquid. (Fig. 60.) When the drug is thus suspended near the top of the liquid, each portion of the solvent as it becomes charged with the soluble portions of the drug falls to the bottom of the vessel because of its greater gravity, and is replaced by fresh solvent. This successive saturation of the menstruum, and its replacement by fresh portions continues automatically until the entire liquid is equally saturated throughout and the drug practically exhausted, when the cloth containing the drug is lifted out, subjected to expression, and the expressed liquid added to that in the vessel. This method of conducting a maceration is sometimes known as Circulatory Displacement.

Maceration is always understood to be conducted at the ordinary temperature of the laboratory. As the solvent powers of a liquid vary with the temperature, it follows that the amount of matter extracted by maceration will vary with the temperature of the laboratory, and with the season of the year, a fact which should be borne in mind in the manufacture of galenicals. When maceration is accompanied by the use of heat the process becomes digestion.

Digestion—Digestion is maceration carried on with the aid of heat, which may be at any temperature desirable. In the case of organic vegetable drugs the temperature of digestion is usually a *gentle heat*, i. e., a temperature not exceeding 50° C. to 60° C., to avoid the injurious effects of a higher temperature upon their active principles.

In some cases digestion is required to be conducted at a temperature above the boiling point of the liquid employed. As a liquid cannot be heated above its boiling point in an open vessel, this necessitates the use of closed vessels made to withstand pressure, when the temperature which may be reached is limited only by the strength of the vessel. The oldest form of this apparatus is the Papulus Digester, used for digesting animal matters, at a high temperature for the purpose of converting their insoluble collagen into soluble glue. Its mechanism is very simple, consisting merely of a stout boiler, with means for the introduction of steam under pressure, and a safety valve which can be loaded to produce any desired pressure.

Sometimes it is desired to subject a substance to the prolonged action of a volatile solvent, as alcohol or ether, at or near its boiling point. In such cases, in order to avoid the use of pressure apparatus, and at the same time prevent the waste of solvent by evaporation, some means must be employed to condense the vapor as fast as formed and return it to the vessel. The best means of accomplishing this is to attach to the flask containing the liquid a Liebig's condenser, either perpendicular, or inclined upward, so that the vapor which leaves the flask is liquefied in the condenser and returns to the flask. A condenser used in this manner is usually known as an inverted or reflux condenser.

Another, but much less efficient expedient, is to invert a funnel loosely in the mouth of the flask, the funnel and neck of the flask acting to some extent as a condenser.

This method is of but little benefit with very volatile solvents.

Infusion and Decoction are both varieties of digestion, the first usually being accomplished by pouring boiling water over a vegetable drug and covering the vessel until cold, and the second by boiling a vegetable drug in water in an open vessel.

EXPERIENCE WITH A LINE OF PREPARATIONS WHICH HAVE SUCCESSFULLY REPLACED PATENTS.*

J. T. PEPPER, Woodstock, Ont.

A "Klondike," as yet undiscovered by the majority of pharmacists, exists to-day in every retail drug business, and best of all, golden nuggets can be worked for and obtained by every enterprising man of us. We need not endure the rigors of an Alaskan winter; we need not risk our health or life; we need only go to work in our own store. With most of us it is next to impossible to increase the total amount of business done, but it is an easy matter to increase the amounts of profits. And it is not so much the total amount of business done as it is the total amount of profits secured that pleases us. An increased business does not necessarily mean increased profits; but it is the profits that most of us are after.

The best business to-day, notwithstanding department-store competition and cut prices, is the drug business. No other business of its size presents so many charms and attractions, so many fortune-making opportunities, or so many chances for doing public good. But each pharmacist must make his opportunities; he must not, Milcauber-like, wait for them to turn up, for they may never come if he does. One of the golden opportunities that every pharmacist may grasp with decided gain is the making of a line of his own proprietaries. A pharmacist to-day must be more than merely a buyer and seller of drugs, patent medicines, etc., if he would be a success or if he desires golden coin to jingle in his till. He must become a manufacturer.

It is a question with many a pharmacist whether he can make a line of preparations of his own and introduce them to the public successfully. It can be done, and it can be made a success of. I will relate my own experience; it may prove helpful to others.

I make almost a full line of my own preparations. I will select Compound Syrup of Hypophosphites as an example, and tell the means that I have made use of in order to make a success of it. I make it myself. I did not succeed at first. I could not get all the hypophosphites dissolved, and then there would be a precipitate, but I persevered, and now I can make a Compound Syrup of Hypophosphites with every salt entirely in solution and with no after-precipitation. Nothing but the very best will do if you are going to put a preparation of your own on the market. This should apply to every preparation. You should know all about them. You should know all about every drug or chemical that you use in them. Knowledge begets confidence, and without you have confidence in your own preparations you cannot make them a success.

I put my Compound Syrup of Hypophosphites up in sixteen-ounce clear oval tint bottles with a label on one side of the bottle only. I use neither carton nor wrapper. My label is printed in gold, red, and blue. I call the preparation "Pepper's Tonic Hypophosphites," and sell it for \$1.00 a bottle, or six bottles for \$5.00. I sell about three hundred bottles every year. Our town has about nine thousand population.

Creating a Demand—It takes time to introduce a new preparation to the public; it cannot be done in a day, week, month, or year. You may know that your preparation is a good one, but others do not know it, and it is to obtain their recognition of its worth that you advertise and tell its curative qualities to the public.

To make sales I advertise in our daily and weekly papers. I distribute circulars, cards and small papers. I dress my window with my own preparations. The window is a good salesman and a good place to do effective advertising in. My clerks and myself talk our prepara-

* Reprinted from Bulletin of Pharmacy, Prize Essay.

tions to our customers whenever we get a good chance, and this is the best kind of advertising. It is a personal way of advertising and almost always brings results. It may not make a sale just at the time, but I find that in nearly all cases a talk with a customer about my own preparations bears fruit in the future.

In advertising and personal conversation I make use of arguments like the following to help me sell my own preparations:

I make this preparation myself.
I know exactly what goes into every bottle.
I can vouch for the purity and reliability of every ingredient.

I know that every ingredient is entirely dissolved.

This preparation is composed of just those proportions of drugs and chemicals which experience has proven most effective.

Being honestly and capably made, it is superior to any preparation of its kind.

It will therefore accomplish more than they could hope to do.

This has been proven by many of my customers who have tried both, and to whom I can refer you in support of my statements.

I sincerely believe that any pharmacist in whose technical ability the people believe, can prepare and launch a series of his own preparations with a surety of success. He needs only to let the people know what he is doing, what care and skill and honesty he is putting into this endeavor, to convince them that his preparations are what he claims for them—the superior of similar products prepared by the manufacturer.

The "Package."—I design my own labels and wrappers, and endeavor to have them made distinctive, personal, and original. I try to have them entirely different from the regular patents, so that they can in no way be said to be an imitation of any of them. I have them made as beautiful and attractive as possible. I spend a little more money on my labels and wrappers than most druggists do, but I believe that it is money well spent. A well dressed man or woman is more attractive than a poorly dressed one. The same truth applies to packages of prepared medicine. A bottle of medicine with a beautifully printed or lithographed label and wrapper in colors will make friends for itself and assist in its own sale far more than one with an ordinary label and wrapper printed with black ink. It makes a good impression at first, and first impressions are lasting. Of course, as I have said before, the contents of the bottle must be the very best, else the beauty and attractiveness of the label and wrapper will only help you to sell one bottle. The handsome label and wrapper only help you to introduce it; but the medicine itself must make its future sales.

I have followed similar tactics in introducing and pushing sales of my Blood Purifier, Cough Cure, Little Liver Pills, etc. I have a very satisfactory local demand for all my preparations, and the sales are constantly on the increase.

There are great inducements for the druggist to make his own preparations. The profit to a drug business made in this way is large, but perfectly legitimate. Why do druggists serve a long and laborious apprenticeship, attend colleges of pharmacy, and pass rigid examinations? It is for the very purpose of obtaining a knowledge of drugs, their preparations, doses, methods of manufacture, etc. Then why not put this knowledge, obtained so patiently and laboriously, and at so much time and cost, to some practical, money-making purpose? If you have the knowledge and the ability to manufacture a blood purifier, or any other preparation, why should you not obtain the profit therefrom? Is it not perfectly legitimate? Of course it is!

Formulas.—I will give first the formula of my Compound Syrup of Hypophosphites, since this is the preparation that I have selected to talk about. With me this preparation has been the best seller of the lot, but with most pharmacists carrying a line of their own preparations, probably the blood purifier leads the list. The formula of my blood purifier and of my cough cure follow that of the hypophosphites.

Syrup Hypophosphites Compound.

Calcium hypophosphite.. 5 ounces (Troy), 160 gr.
Potassium hypophosphite 2½ ounces (Troy), 80 gr.

Sodium hypophosphite.. 2½ ounces (Troy), 80 gr.
Manganese hypophosphite 20 grains.
Citric acid 480 grains.
Potassium citrate 800 grains.
Quinine sulphate 320 grains.
Solution iron hypophosphite..... 4 fluidounces.
Strychnine (alkaloid).... 20 grains.
Granulated sugar 15 pounds.
Hypophosphorous acid..... 4 fluidounces.
Pure water.....ad. 323 fluidounces.

1.—Powder the manganese hypophosphite, potassium citrate and citric acid separately, and then mix them thoroughly by trituration in a mortar.

2.—Powder the calcium hypophosphite finely in a small mortar, and then put it into a large mortar.

3.—Powder the sodium hypophosphite finely in a small mortar, and then put it with No. 2.

4.—Mix the potassium hypophosphite and quinine sulphate, and add them to the hypophosphites of calcium and sodium in the large mortar. Mix and triturate them well together, then add to them No. 1 mixture and triturate the whole thoroughly. Add 20 or 30 ounces of boiling water, continuing trituration, and then strain this solution into a large two-gallon jar, keeping the undissolved portion of the salts still in the mortar. Dissolve the strychnine in the hypophosphorous acid and add it to the salts in the mortar and triturate again. Add 30 or 40 ounces more of boiling water and triturate till dissolved, then strain into the jar. Dissolve the sugar in the balance of the water by heat and strain into the jar also. Add the solution of iron hypophosphite and sufficient water to make 320 fluidounces.

The solution of iron hypophosphite for the above is made thus:

Ferric alum 616 grains.
Sodium hypophosphite 408 grains.
Potassium citrate 400 grains.
Glycerin 10 fluidrams.
Pure water, q. s. ad. 4 fluidounces.

Dissolve the ferric alum in eight ounces of water, and the sodium hypophosphite in four ounces of water. Strain both through absorbent cotton. Pour the alum solution into the sodium solution until a heavy white precipitate is formed; pass combined solution through a cotton strainer, transfer the precipitate to a mortar and add to it the citrate of potassium and glycerin. Then put this green-colored mass into a graduate and add boiling water to make four fluidounces. Heat in a flask or porcelain evaporating dish till complete solution is accomplished.

I make my own hypophosphorous acid for the hypophosphites, using this formula:

Potassium hypophosphite 416 grains.
Tartaric acid 600 grains.
Pure water 1176 grains.
Dilute alcohol 1200 grains.

Dissolve the potassium hypophosphite in the water and the tartaric acid dissolve in the dilute alcohol; mix the two solutions in a bottle, cork, and set aside in a cool place for twelve hours; filter, weigh the filtrate, evaporate off the alcohol on a water-bath, and finally add enough water to make original weight. Keep in a glass-stoppered bottle.

Iron hypophosphite is a very difficult salt to dissolve, but we make our own solution of the salt, and when we add it to our compound syrup of hypophosphites we know that the quantity is in it and that it is in solution. Six minims of this solution of iron hypophosphite represents one grain of the dried salt.

I call my blood purifier "Sarsaparilla with Celery," and the formula that I use is as follows:

Blood Purifier.

Sarsaparilla root 20 ounces.
Cascara sagrada bark..... 20 ounces.
Burdock root 15 ounces.
Clover tops 15 ounces.
Taraxacum root 20 ounces.
Celery seed 16 ounces.
Gentian root 15 ounces.
Sassafras bark 20 ounces.
Glycerin 83 fluidounces.
Alcohol 125 fluidounces.
Water, q. s. ad. 50 pints

Make by ordinary percolation.

My cough cure is called the "Red, White and Blue Cough Cure," with a cut of a Union Jack in colors on the wrapper, and the formula is as follows:

Cough Cure.

White pine bark..... 50 ounces, Troy.
 Balm of Gilead buds..... 6 ozs., 5 drs., 20 grs., Troy.
 Spikenard root..... 6 ozs., 5 drs., 20 grs., Troy.
 Sassafras bark..... 3 ozs., 2 drs., 40 grs., Troy.
 Wild cherry bark..... 50 ounces, Troy.
 Flooderoot..... 5 ounces, 400 grs., Troy.
 Morphine acetate..... 150 grains.
 Chloroform..... 6 ozs., 5 drs., 20 grs., Troy.
 Granulated sugar..... 30 lbs. av.
 Water, q. s..... ad 50 pints.

Made by ordinary percolation, dissolving the sugar in the percolate, then dissolving the morphine acetate in a small quantity of the syrup, adding this to the rest, and lastly adding the chloroform.

The formula that I use for my Liver Pellets is as follows:

Liver Pellets.

Aloin resin..... 1-10 grain.
 Jalap resin..... 1-10 grain.
 Podophyllin..... 1-5 grain.
 Extract hyoscyamus..... 1-20 grain.
 Extract aux vomica..... 1-20 grain.
 Oleo-resin capsicum..... 1-20 grain.

These I have made for me by one of the large manufacturers of pills. I have them sugar-coated in a lavender color. I put fifty in a small, flat, oblong box and sell them for 25 cents a box. In order to help the sale of these we put up samples in small envelopes, enclosing a circular in each envelope, and distribute them from house to house throughout the town. We also distribute the samples across the counter, and place one in each package of our sarsaparilla and cough cure sent out.

CREDULITY AMONG SCIENTISTS.

A new line of argument is taken up by Prof. Edward S. Morse against those reputable men of science that believe in the existence of certain occult or mystic phenomena. He argues apparently that since we have a great variety of these phenomena which can be arranged in a scale, varying from the evidently fraudulent at one end, through the doubtful and suspicious, up to the apparently genuine at the other, and since the number of intelligent believers in the phenomena varies correspondingly, hence all the phenomena are alike fraudulent, and all the believers alike deceived. He says in *Science (Literary Digest)*:

"Here you have, then, a number of men with varying degrees of penetrating powers. One set all agape with speculative wonder, as Huxley said of Bastian, accepting stuff as genuine which many alert newspaper reporters had shown to be spurious; another set, endowed with a medium of common sense, meditating the peripatetic mediums, yet snared by more skillful frauds; still higher are others who are not yet deceived by these, but are in turn bamboozled by more deftly played tricks; and, finally, the highest intellects who, in an encounter with some exceedingly adroit female medium, are puzzled by the manifestations, and, not having that judicious calm which might frankly wait for more light, plunge into the regions of the occult for an explanation as readily as did their more ignorant confreres under the capers of the charlatans. I think a fair explanation of this attitude of the human mind, which always excites more wonder in a rational being than do the sequences of cunning mediums, is that we have clearly before us the evidences of survival. From a time when all believed in omens, portents, dreams, warnings, etc., what wonder that a sufficient number of molecules are ready to admit whose potency overrides common sense? In no other way can we explain why in the latter years of the nineteenth century there are in our midst men, otherwise intelligent, who fully believe in astrology. It is as utterly impossible to convince people thus afflicted as it would be to argue with inmates of an insane asylum. We may regard with interest, akin with pity, perhaps, those who waste their phosphorus in trying to convince the world that they are right. We are compelled to explain their attitude, not by significantly striking our head with the index finger as we contemplate them, but insisting that they present most interesting examples of survival, and, if they will but realize it, how interesting they would be to themselves!"

In concluding, Prof. Morse argues that survival is stronger with such beliefs as these than with discarded scientific ideas, because they were more widespread and firmly held. For instance, hundreds of people still believe in some form of witchcraft, where one holds that the earth is flat, because the former belief was common property, and was very near to men's daily lives, whereas only the learned cared whether the earth was round or flat, or desired to know what shape it might be.

(Written for the Era.)

FRENCH PHARMACEUTICAL POTTERY.

Although the leading museums of Paris and London contain large collections of French earthenware, as well as of Italian drug pots, the French pharmaceutical ware is conspicuous by its absence from the ceramic treasures of the two capitals, and a casual visitor might well suppose that the old French potters altogether neglected the wants of the apothecary.

Such was far from being the case, as a visit to the Sevres Ceramic Museum, or the "Central Pharmacy," will prove. The former contains an assortment which, if not numerous, is most skillfully arranged and has recently been catalogued (for the first time in 50 years) by M. Garnier.

The remarkable collection at the "Central Pharmacy of Parisian Hospitals," 47 quai de la Tournelle, just opposite Notre Dame, may be said to be entirely unknown, not only to the ubiquitous Anglo-Saxon visitor to Paris, but to the greater part of the inhabitants of the French metropolises. These drug pots—nearly 500 in number—were rescued about ten years ago from the pharmacies of the Parisian dispensaries, almshouses and hospitals, where they were lying neglected and forgotten, and brought under the roof of the quaint old Government building—itsself a historical curiosity—whence these establishments draw all their medical stores and remedies. The most remarkable jars have been photographed for M. Dorveaux (librarian of the Paris School of Pharmacy) to illustrate his forthcoming work on "Old Drug Pots and Their Inscriptions," and he has kindly placed at the disposal of the Era half a dozen unpublished illustrations.

Classification.

This old ware, remarks M. Dorveaux, should properly be classed under seven heads:

1. Bottles for distilled water (large ones for hospitals; smaller for ordinary pharmacies), as fig. 3.
2. Jugs or pitchers for distilled waters and syrups (hospitals only), figs. 4 and 10.
3. "Chevettes" or "drug ewers," as figs. 1 and 3, for syrups, oils, etc.
4. Pill jars, for pills or pill mass, as fig. 2.
5. Cylindrical jars (French: "pots à canon"; generally styled "albarelle") for ointments. Figs. 5, 10 and 11.
6. Large pots for Theriaca, Mithridate, Orvietan and other electuaries of a cure-all character. Figs. 7 and 9.
7. Earthen jars, usually large, plain and simple, for Theriaca and other drugs made in large quantities.

Historical.

Up to 1610 French apothecaries imported the handsome Italian drug jars referred to in a previous article.

But about this date the Duchess of Nevers married an Italian nobleman, who brought in his train the Italian potters, who first made the celebrated

Nevers Ware

of which large and handsome specimens now command high prices. Three years ago an artistic drug pot, 30 inches high, was sold in Paris (at the Hotel Drouot) for 470 dollars. It formed part of Mr. Ch. Antiqu's collection, and came from a provincial French hospital. The inscription upon it, "Mithridate," was the name of an electuary greatly in vogue 300 years ago, as the inscription

MITHRIDATE DAMOCRATIS MEDICAMENTA
 DEORUM MANUS.

on another Nevers vase attests.

The deep blue ware with white ornaments (of which Fig. 1, photographed at Sevres, is a good specimen, marks the most artistic epoch of Nevers pottery. This chevette bears an inscription "S. de POMES SIMPLE" (Apple Syrup). Towards the close of the seventeenth century, Nevers art declined, and the 200 pots at the Chateau-Thierry hospital pharmacy, made in 1691, are of less value, though interesting enough for their inscriptions, etc.

The pill jar in Fig. 2 is probably 400 years old, and is supposed to have been made at Nevers or Lyons by an Italian.



"Old Rouen" Pottery

is well known to collectors, but few drug pots were made in this charming and thoroughly French ware. It is said that one of the few existing

collections was sold at Fournelle Hospital about ten years ago.

The influence of Rouen art may, however, be easily recognized in the syrup ewer in Fig. 3. This, like the syrup pitcher in Fig. 4, is in



"Old St. Cloud" Ware.

This pitcher is especially characteristic. The scrolls of roses running in bands are in slate-blue or white. If I mistake not, this belongs to the set of pharmacy ware given by Louis XIV to Versailles hospital, where he had a special infirmary for the sick guards and servants of the Royal Palace. Still more like Rouen ware are the articles made at Paris for

A Royal Lady Pharmacist.

Louise Adelaide, abbess of Chelles, was second daughter of the dissolute Regent. It was the custom in those days for the prince or nobleman who endowed a monastery or hospital (the two words were nearly synonymous in by-gone times, and to this day half the sick poor in France are nursed by sisters of charity), to emblazon his arms on the drug pots he presented. Thus the vases made in 1720 by Digne, of the rue de la Roquette, bear the escutcheon of the Royal family of Orleans (Fig. 5). The abbess added to many other accomplishments a knowledge of medicine and pharmacy, and it is highly probable that these charming jars, etc., were destined for her personal use in the dispensary, as the specimens at Sevres and Cluny are small and easy to handle.

The Louis XV Drug Pots

shown in Fig. 6 are from St. Charles' Hospital, Nancy. The largest are now in the Lorraine Museum of that town, but M. Flaton, pharmaciat of Paris, has specimens, and several may be seen at Sevres. M. Garnier classes these pharmacy jars "among the handsomest products of French ceramic art," no mean praise from so high an authority. Made at the famous pottery of Niederwiller (Lorraine), they bear the crown and monogram of Stanislas, father-in-law of Louis XV., and last king of Lorraine, for at his death the province became part of France. I was rather surprised to see "Citrate of Magnesia" and similar up-to-date inscriptions on some of the pots, but M. Garnier, penknife in hand, showed me this had merely been painted on at a later date.

The large jar

in Fig. 7 is a specimen of Lille pottery, the serpents (emblems of the healing art), and the Rouen-like decoration should be noted; this is a good example of the large pots referred to in M. Dorveaux's list, which usually stood in the place of honor in the apothecary's shop. The two bottles in Fig. 8 are Paris ware (probably about 1680).

Paris Pottery

has been undeservedly neglected by writers and collectors. The Digne pots already referred to were long classed as Rouen ware. Yet 200 years ago, as now-a-days, the rue de la Roquette—the name will be familiar as that of the street where the guillotine still periodically performs its ghastly functions in public—was the center of the pottery trade of the French metropolis. Here, in 1778, Thory made the jars shown in Fig. 9. They show the arms of Necker and his wife, and were presented by the celebrated Minister of State to the Paris hospital which still bears his name. Like the Beaufon jars (which are also adorned with the founder's arms), these are now at the Central Pharmacy.

Among the various specimens of Parisian drug ware at Sevres (illustrated in Fig. 10), are pots from Beaume's old pharmacy, inscribed UNG. MERCUR, EXT. CROCI, and EXT. TRIFOLI; jars bearing the Royal fleur de lys. The "CONS CYDONIOR" receptacle was made by a famous "sans-culotte," Ollivier, of the rue de la Roquette. The inscription on another jar should be pondered over by unmarried pharmacists, "QUI CAPIT UXOREM CAPIT ATQUE DOLEM."

But we now reach the Revolutionary period, when earthenware gave way to the modern glass and porcelain receptacles, and with a glance at the handsome specimen of Chantilly ware (i.e. 11), must close our necessarily brief notes. These

Relics of the Past

still linger in many French hospices. The Moutiers pottery at Chambéry, the Arduis ware of Montauban, the jars from Clairvaux Abbey, now at Troyes, are cited as worthy of a visit by those interested in olden drug ware.

Even at St. Germain-en-Laye, an hour's bicycle ride from Paris, is to be found a little pharmacy in the "hospice civil" which has little changed for the last 200 years. From the pots and mortars to the dress of the quiet-voiced "Sisters," nothing seems altered since Louis XIV's day.

THOMAS HENRY, APOTHECARY, AND THE ORIGIN OF ARTIFICIAL MINERAL WATERS.

By WILLIAM KIRKBY, Ph. C.

Dr. Schunck, in his presidential address before the annual meeting of the Society of Chemical Industry last year, stated that "to Dr. William Henry is sometimes given the credit of the invention of aerated waters. There is some doubt about this, but if correct, he must be numbered among the benefactors of mankind as having added largely to its innocent gustatory pleasures."

I am not aware that Dr. William Henry, son of Thomas Henry, "has been credited with the invention of artificially aerated water as a beverage." It is, however, on record that Thomas Henry, the father, was the inventor of artificial mineral waters, as appears from the following extract from Dr. Angus Smith's "A Century of Science in Manchester," (1881, p. 127):

Whilst without going deeply into the history of artificial mineral waters and aerated drinks, we are inclined to believe that the elder Henry (Thomas Henry, born October 26 (old style), 1734; his son, William Henry, born 1774), was the true inventor, or evidently considered that he was the first in the field. Dr. Henry separated from his partner, Mr. Thompson, taking for himself the magnesia, and leaving the aerated waters to the latter.

In order to ascertain to what extent we are really indebted to Thomas Henry in this matter, it may be well to briefly review his work in connection therewith.

The interest which he took in the questions dealing with fixed air (carbonic acid gas), and the impregnation of water with it, must have been very great. If we may judge from the pertinent notes appended to the text of his translation of Lavoisier's "Physical and Chemical Essays," That he edited and translated this work, which treated so fully of the history of carbonic acid gas and the endeavors to make artificial mineral waters, and in so doing exhibited such a thorough acquaintance with the whole of the subject, quite precludes the idea that he ever claimed to be the inventor of artificially aerated waters. He was quite familiar with the work of Vauquelin, Priestley and others. Concerning the first of these, who was professor of chemistry in the University of Montpellier, he has a foot note in which he claims for Dr. Brownrigg the honor of being the first to establish the identity of gas in natural mineral waters with Boyle's "fætitious air" and choke damp. This note is worthy of quotation in full.

Mr. Rouelle... and Mr. Lavoisier, in his account of Mr. Vauquelin's experiments, page... have attributed the first discovery of the natural impregnation of water to this ingenious professor. I should think myself inexcusable, therefore, if I did not take this opportunity of doing justice to the merits of our very worthy and learned countryman, Dr. Brownrigg, and this cannot be done more effectually than by transcribing a passage from Sir John Fringie's elegant "Discourse on the Different Kinds of Air," delivered before the Royal Society, No-

ember 30, 1773: "I shall only observe that the memoir containing the account of Mr. Venel's experiments was not read before the Royal Academy of Sciences till the year 1750, and that he has supposed the air contained in waters which have been called 'acidulous' to be common atmospheric air."—T. H.

Thus the fuller discovery of this principle we owe to Dr. Brownrigg, of Whitehaven, who about thirty years ago (1743), began clearly to unfold this mystery. But those curious papers were not then inserted in the 'Transactions,' as the too modest author had requested a delay till he should be able to make them more worthy than that honor, which is denominated 'the honor,' that a more intimate acquaintance with those pitious ays in mines called damps might lead to the discovery of that principle of mineral waters known by the name of spirit; that the mephitic exhalation termed the choak-damp he had found to be of a permanent elastic, and from various experiments he had reason to conclude that it entered the composition of the waters of Pyrmont, Spa and others, imparting to them that pungent taste from which they are denominated 'choak-damp,' and likewise that volatile principle on which their virtues chiefly depend." "In order to ascertain a fact of so much consequence, Dr. Brownrigg took the opportunity when at Spa several years, to make some experiments for this purpose, when he was satisfied that those waters pregnant with the artificial or factitious air of Mr. Boyle, the same with that of the suffocating grotto near Naples, and the same with the choak damp of our coal mines, for as much as this air instantly extinguished flame and the life of those animals he enclosed in it."—(Lavoisier's "Physical and Chemical Essays." Translated by Thomas Henry, 1776).

In 1767 and 1768, Priestley was experimenting upon the artificial impregnation of water with fixed air, and in 1772 he returned to the subject in the hope of being able to devise a drink which should be a prophylactic against the scurvy in seamen. Priestley's apparatus was simplicity itself, and was very soon improved upon by Nooth, Parker and Magellan (Mag'alhaens). It was with a view to improving upon the glass machines in which that Henry designed the apparatus described in a pamphlet entitled: "Account of a method of preserving Water at Sea from Putrefaction, and of restoring to the water its original pleasantness and purity, to which is added a mode of impregnating water in large quantities with fixed air for medicinal uses, on Board Ships, and in Hospitals, and likewise a process of the preparation of Artificial Yeast, by Thomas Henry, F. R. S., and member of the Medical Society of London. Warrington. Printed by W. Eyres for J. Johnson, No. 72 St. Paul's Church-yard, London. MDCCCLXXXI." As this pamphlet appears to be rare, it may be well to quote the whole of the portion dealing with the impregnation of water with fixed air. It affords indubitable proof that Henry only claimed for his apparatus that it made it possible to prepare aerated water on a larger scale than heretofore.

The Method of Impregnating Water in Large Quantities with Fixed Air, so as to Give it the Properties of Mineral Water, for the Use of the Sick on Board of Ships and in Hospitals.

Dr. Priestley some years ago communicated to the Lords of the Admiralty a method of impregnating water with fixed air obtained from an effervescing mixture of chalk and vitriolic acid, and of making an artificial Pyrmont water. This operation has since been considerably facilitated by the invention of Dr. Nooth's glass machine, with Mr. Parker's and Mr. Magellan's improvements. That machine, though admirably contrived for the preparation of such quantities of artificial mineral water as may be necessary in private families, would be too small for the sickly crew of a large ship. But it appears to me that a mode may be adopted by which the process may be performed on a much larger scale.

The advantages which would proceed from an easily practicable method of supplying the sick men in long voyages with such water must be obvious to every medical practitioner. The mineral waters of Pyrmont and Seltzer may by these means be closely imitated, and the artificial water will be beneficial in all cases in which the natural is found useful. By this process also may Mr. Bewley's mephitic julep be prepared—than which the materia medica, perhaps, does not afford a more efficacious, or more grateful, means in putrid fevers, scurvy, dysentery, bilious vomitings, hectic, etc.

The Process.—Cut off the two extremities of a calf's or pig's bladder, and having previously moistened them, into one end insert the top of a tubular iron pipe, and round the neck of which it is to be closely fastened with strong thread. Into the upper end introduce a long bent tube, and tie them round in the same manner. The pipe must be passed through the hole, formed by a hot iron borer, in a large cork adapted to the orifice in the cask, to which it must be cemented; and the length of the pipe from this point must be such as to reach within a few inches of the bottom of the cask, which is to be completely filled with fresh water, or such as has been recovered from lime.

To a quantity of mild calcareous earth and water, as directed in the preceding process, placed in an air vessel,

add a small portion of strong vitriolic acid, and by the time most of the common air may be supposed to be expelled by the fixed air, arising from the mild calcareous earth, add a larger quantity of acid, and putting the tubulated stopper in its place, the bladder will become inflated. Press it gently till its sides collapse; and then, introducing the pipe with its cork, into the office of the cask, again press the air forward, as it distends the bladder, till the water cask, where, bubbling up through the water, it will rise to the surface, and by its pressure, force the water to ascend into the funnel, which is to be cemented into the head of the cask. In proportion as the water becomes impregnated with fixed air, that in the funnel will return into its place; but, if at any time, the latter should rise so high as to be in danger of overflowing, a quantity of air may be let out of the water cask by means of a small plug. And this is necessary to be done occasionally, to discharge the residuum of fixed air, which is not soluble in water.

The water may be tested from time to time by drawing off a small quantity at a cock fixed into the cask, and by tasting it, to know when it has become sufficiently pungent taste, the process may be finished. This will take several hours, but in this case a little attendance will be required.*

If the operation be required to be performed more expeditiously, it may be quickened by agitating the water cask. To do this, the tubular stopper must be withdrawn from the air vessel, and supported, together with the bladder, by an assistant, while the cask is shaken. During this time another tubular stopper must be put into the air vessel, and the bladder immersed in it, so that a quantity of lime water to prevent waste. When the agitation has been continued for some minutes, in proportion to the falling of the water in the funnel, replace the stopper attached to the bladder in the air vessel when taken out of the lime water, and proceed as before, repeating the agitation occasionally.

During the process, additional quantities of vitriolic acid may be introduced into the air vessel through the opening, which is to be, at all other times, carefully secured with its stopper.

Perhaps the most convenient size for the cask, intended for the purpose of impregnating the water with fixed air, would be about ten or twelve gallons. Should the scurvy or other putrid diseases prevail, or should putrid provisions or other septic causes render the crews more than usually liable to such diseases, and occasion a larger consumption of the water to be necessary, the cask may be proportionately larger, or a greater number of small casks may be employed.

It is interesting to notice Henry's use of the bladder as a primitive kind of pump. The first suggestion, however, for the use of mechanical means for increasing the pressure of the gas seems to have come from Priestley, who wrote: "I do not doubt...but that by the help of a condensing engine, water must be much more highly impregnated with the virtues of the Pyrmont Spring, and it would not be difficult to contrive a method of doing it."†

In 1783 Thomas Henry communicated to the Manchester Literary and Philosophical Society a paper by Dr. Haygarth upon the impregnation of liquids with fixed air, in which is described an ingenious apparatus, the essential feature consisting of a pair of household fire bellows for increasing the pressure of the gas.

Beyond Dr. Angus Smith's reference to Henry's association with the commercial manufacture of mineral water, I have not met with any written or printed record. Early in this century there was a Thompson engaged in this trade, and the firm is in existence to-day under another name, but when and for how long the partnership between Henry and Thompson existed, when it was terminated and where the waters were made, I have not succeeded in ascertaining. Mr. Ogden (Messrs. T. and W. Henry), informs me that the present building in which the celebrated magnesia is made was erected in 1870, and there are no vestiges of mineral water manufacture about the premises, neither do the business archives contain any records of transactions in goods of this class.

Thomas Henry's interest in fixed air extended beyond artificial mineral waters. In the pamphlet already referred to, he describes a yeast made by impregnating with fixed air a mixture of flour and water thickened by boiling, and then mixing it with flour and warm water and "setting to rise" before baking. He thus anticipated the production of aerated bread by about half a century. In 1785 he described a process for the aeration of beers and wines which had become vapid.

*The operator must be attentive that the top of the cask is air tight. If some water be poured upon it, any defect may be detected by the air bubbling through the water, and the faulty place must be secured with putty. †"Experiments and Observations on Different Kinds of Air," by Joseph Priestley, LL. D., F. R. S. 1780. Vol. I.

The apparatus consisted of the lower globe of Nooth's machine with the neck closed by a perforated stopper; this was charged with chalk, water and the necessary acid, and lowered into a cask containing the beer. The pressure of generated gas overcame that of the superincumbent liquid, by which it was absorbed until the point of saturation was reached.

It is clear, I think, that it is to Thomas Henry, apothecary and chemist, of King street, Manchester, and not to his son William, that the credit is due of being a pioneer in the manufacture of artificially aerated waters. It is worth noting that Henry's pamphlet was published in 1781, that is, eight years before the establishment of the Geneva factory, and about twenty years before the establishment of English houses for the regular supply of these waters. (Pharm. Jour.)

PHARMACY.

BOROTARTROL is a new antiseptic consisting of neutral sodium tartrate and boric acid.

JECOROL is a preparation claimed to consist of the active constituents of cod liver oil, and is recommended as a substitute for the latter.

HÆMOSTAT is a remedy for nose bleed, which is applied on the sides and the root of the nose. It consists of tannin, sulphate of quinine and benzoated fat. (Ph. Post.)

COCAINE HYDROIODATE, $C_{17}H_{21}NO_4.HI$, occurs in colorless crystals, sparingly soluble in water. It has been suggested as a substitute in dental surgery for cocaine hydrochlorate as a means of producing electro-anæsthesia.

SAPONAL is a cleansing preparation, composed of 20 per cent. soap, 60 per cent. sodium carbonate crystals, sodium chloride, etc., 2.2 per cent., and water 11 per cent. (Ph. Post.)

BORSYL is a dusting powder, with which F. Grimm has obtained good results. Its active constituents are boric acid, borates of alkalies and alkali earths and cetyl alcohol. (Ap. Ztg.)

TAPEWORM REMEDY FOR CHILDREN.—A mixture of tamarind pulp, 1 oz., powdered kamala, 90 grains, to be taken at one dose, with lemon juice to suit the taste, is recommended by Guida. (Ap. Ztg.)

ACETONE-COLLODION, which has the advantage of greater elasticity than ordinary flexible collodion, is prepared from 5 p. guncotton, 10 p. ether, 10 p. alcohol, 20 p. acetone and 6 p. castor oil. (Ph. Post.)

DECOLORATION OF PALM OIL.—The oil is filtered at or below 100° C., then run into a suitable heated vessel, and a current of ozone, ozonized oxygen or ozonized air passed through, until decoloration is complete. (Chem. Ztg.)

QUININE CHLOROPHOSPHATE, $C_{20}H_{24}N_2O_5.HCl.2PO_4H_3 + 3H_2O$, occurs in colorless crystals, soluble in 2 parts of water and containing about 50 per cent. of the alkaloid. It has been used with good success in obstinate attacks of malaria and nervous headaches.

POTASSIUM ACETATE CONTAMINATED WITH BARIUM.—Bonnema (Ph. Weekbl.) found a sample of commercial potassium acetate to contain 0.8 per cent. of barium acetate, and in view of this considers it necessary to add a test for barium to the official tests. (Ap. Ztg.)

QUINOPYRIN is a new freely soluble combination of antipyrin and quinine hydrochlorate which Dr. Laveran uses in treating malaria by subcutaneous injection (Merck's Annual Report). Quinopyrin contains 2 parts

of antipyrin to 3 parts of quinine and dissolves in as little as 2 parts of water.

FERROSOL.—Böhm (Merck's Annual Report), describes Ferrosol as a double combination of ferric saccharate and sodium chloride, which he recommends for the treatment of chlorosis and anemia. It is a clear, black-brown liquid, and may be given in doses of one teaspoonful three times daily.

OINTMENT FOR ITCHING PILES, PRURITUS ANI, ETC.:

Eucaine hydrochlorate	1 part
Menthol	0.2 part
Olive oil	2 parts
Linolin, enough to make	10 parts

Prepare as an ointment.

SILVER SULPHOPHENATE is a fine crystalline powder, soluble in water, and contains about 28 per cent. o. metallic silver. The preparation must be protected from light and air, otherwise it is liable to split up into metallic silver and phenol. It is said to possess good antiseptic properties, and to be preferable to silver nitrate, owing to its non-corrosive action.

PRODUCTION OF TARTRATES.—According to a patent the crude materials are purified in the following manner: The tartrates are brought into solution by boiling with a solution of alkali carbonate, the solution decolorized with alkali-hypochlorite and then the tartaric acid precipitated as a pure, white calcium salt by adding a slight excess of calcium chloride. (Chem. Rep., through Ap. Ztg.)

PREPARATION OF PURE STRONTIUM SALTS.—Deenham (Zeitsch. f. Ph.) gives the following method: Commercial strontium nitrate is converted into oxide by heating and the barium oxide removed from this by washing with cold water. It is then dissolved in hot water, from which, on cooling, the strontium hydroxide separates in crystals. This is entirely free from impurities and it is used for preparing the various salts of strontium.

MANUFACTURE OF NITRITES.—According to a newly patented process, potassium or sodium nitrite is made by heating 185 parts of sodium nitrate (or a corresponding quantity of the potassium salt), with 250 parts of ferrous oxide. At a sufficiently high temperature, the mixture becomes brown through the oxidation of the oxide to the magnetic oxide of iron (Fe_3O_4) at the expense of the nitrate, which is reduced to nitrite. (Ztsch. Ang. Chem.)

OXOLES.—These new remedies (camphoroxol, mentholox, naphthoxol), are merely fluid mixtures of a 3 per cent. solution of peroxide of hydrogen, 32 to 38 per cent. of alcohol and 1 per cent. camphor, or 1 per cent. menthol, or 2 per cent. naphthol, as the case may be. They may be employed in surgery, and it is claimed they exert a favorable action on suppurating wounds, an inhibitory influence on processes of decomposition and promote the process of healing.

CALOMEL INJECTIONS.—Jullien (Arch. de Med.), employs liquid paraffin as a vehicle for calomel in injections, but considers olive oil, glycerin or mucilage of gum arabic equally as good, provided the pure preparations are used. The single dose of calomel so administered is 0.05 gm. (2-3 grain), for persons weighing 100 pounds; 0.06 gm. (9-10 grain), for 120 pounds; 0.07 gm. (1 grain), for 140 pounds, and 0.07 to 0.1 gm. (1 to 1½ grain), for 160 to 180 pounds of body weight. (Ap. Ztg.)

JOHIMBEHE BARK is obtained from a species of *Tabernaemontana* (?) an Apocynacea growing in the Cameroons. It appears to be highly valued by the aborigines as an aphrodisiac. Spiegel reports (Chem. Ztg.) that it contains two basic substances, viz., johimbine and johimbenine, the latter being considered the active principle. Johimbine has the formula $C_{25}H_{33}N_2O_4$, or $C_{25}H_{29}N_2O_5 + \frac{1}{2}H_2O$. Its physiological action is said to be very peculiar and energetic.

SACCHARIN-SODIUM is, according to Dr. Deschmaecker (W. med. Pr.), a good intestinal disinfectant, which may be given in daily doses of 1 to 2 gm. (15 to 30 grains). It greatly diminishes the germs nearly always present in the intestines, particularly those of the *Bacillus Coli*. It exerts no deleterious action on the function of the kidneys. The compound is easily soluble in water, and contains 50 per cent. of saccharin. Because of its extremely sweet taste, it must be given in capsules. (Ph. Post.).

MANUFACTURE OF ARSENOUS ACID.—The arseniferous ore is introduced into a stationary retort similar to a Bessemer converter. The walls of the retort are provided with openings for introducing air or steam, which is forced in under strong pressure, even before the fused ore is allowed to flow in. Through the action of the current of air or steam the arsenic is oxidized to arsenous acid and carried off with it. The residual ore is permitted to flow out of the retort through an opening in the bottom. (Südd. Ap. Ztg.).

ASEPTIC HAIR TONIC.—Tannic acid, 5 p., and formaldehyde, 20 p., are mixed, and 5 p. sulphuric acid added. The reddish mass so obtained is stirred with water, the latter filtered off, and the residue washed until the sulphuric acid is entirely removed, and dried. The preparation so obtained is dissolved in alcohol (1 + 19) and perfumed as desired. The solution retains its red color on exposure to light, but does not color the scalp. It may be used in place of eau de quinine. (Ph. Post.).

IODOTERPIN, $C_{10}H_{14}I$, is a direct combination of iodine and terpin. It is a dark brown liquid, emitting a smell similar to that of turpentine, and freely soluble in ether, benzole, petroleum benzine and chloroform; absolute alcohol is capable of taking up 10 per cent. Its specific gravity is placed at 1.19 and its boiling point varies from 165° to 175° C. It is said the preparation is a complete substitute for tincture of iodine and iodoform, and surpasses the former by its considerably higher per centage of iodine, which amounts to about 50 per cent. An Iodoterpine dusting powder of 1 to 20 per cent. may be prepared with sterilized kaolin.

PREPARATION OF LACTIC ACID.—Sugar, dextrose, lævulose, molasses, syrup, gum, wood, etc., are treated with milk of lime under pressure at a temperature of 100° C. or more, and the calcium lactate formed either crystallized by concentrating the solution or evaporated to dryness and the residue treated with methyl or ethyl alcohol, in which calcium lactate is soluble. From the calcium salt the acid is isolated in the usual manner by precipitating the lime with sulphuric or oxalic acid. It is asserted that lactic acid so obtained differs from fermentation-lactic acid in being free from butyric and valerianic acids. The process is patented in France. (Chem. Rundschau, through Südd. Ap. Ztg.).

PICRONITRIC OR PICRIC ACID FOR SURGICAL PURPOSES.—For gauze, wadding, bandages, compresses, etc., take per kilogram (35½ ounces) of dressing material:

Methylic alcohol or ether.....	2.5 kgm. (5½ lb.)
Purified sterilized wax.....	0.02 " (5 dr.)
Picric acid	0.15 " (5 oz.)

Picric acid taffeta is prepared by first painting the fabric with a solution of 50 grams isinglass and 5 grams gum arabic in 500 grams water. This solution is then mixed with 150 grams of a 10 per cent. methyl-alcoholic picric acid solution and the taffeta is painted over with it for the second and last time.

Picric Acid Sparadrap.

Lead plaster	100 parts
Yellow wax	10 parts
Gum dammar	15 parts
Methylic alcohol	150 parts
Picric acid	20 parts

The unpleasant staining properties may, according to Prieur (Rep. de Pharm., Merck's Annual Report), be removed by rubbing the stained hands or linen with an aqueous paste of lithium carbonate.

REMEDIES FOR FRECKLES.—The following remedies are given in Ph. Ztg.: (1) Saponify 1 p. poppy oil with 2 p. lead acetate and add 1 p. tincture of benzoin, 5 p. quillaya, 1 p. spirit of nitrous ether and 95 p. rose water. (2) Mix 7 p. dilute nitric acid, 115 p. eau de Cologne, and 10 drops oil of neroli with 60 p. hydrogen dioxide and 100 p. glycerin, and dilute with water to 325 p. Filter after two weeks. Apply to the skin with a linen cloth and let it dry. (3) Mix 25 p. rose water, 2 p. zinc sulpho-carbolate, 25 p. glycerin and 5 p. Cologne water. (4) Triturate together 2 p. bismuth subnitrate and 4 p. gum arabic, and add gradually a mixture of 30 p. rose water, 20 p. pure glycerin and 10 p. tincture of benzoin. Shake before using and apply once or twice a day.

SOLUBLE STARCH AND STARCH SOLUTION.—O. Foerster heats 200-300 cc. of water and 5 cc. of hydrochloric acid (sp. gr. 1.124) to boiling and adds 20 Gm. of starch, previously stirred up with a little water, pouring it in as a thin stream, under stirring. Further heating makes the solution appear as limpid and clear as water. After cooling it is filtered, precipitated with alcohol, the precipitate washed with alcohol and dried over sulphuric acid. To obtain a stable solution of starch, 20 Gm. of starch are brought into solution as indicated above, with the difference that the hydrochloric acid must be accurately measured. The accurately neutralized and filtered solution is made up to 1 liter with glycerin. Both preparations are colored a beautiful blue by iodine. (Chem. Ztg.).

HYDROFLUORIC ACID possesses highly antiseptic properties and it has been employed industrially in distilleries. The fluorides possess similar properties, and they have been taken advantage of therapeutically by Jaccoud and others. Th. Bokorny has published his investigations of these compounds as compared with other substances, and he shows that fluoride of sodium is a less active destroyer of the bacteria of decomposition than fluoride of potassium. The fluorides of barium, aluminum, calcium, magnesium and iron are also shown to be rather powerful antiseptics, while fluoride of ammonium suppresses decomposition only to a very limited extent. It is suggested therefore that fluorides which have been proven to possess powerful antiseptic properties be employed for therapeutic purposes.

NAPHTHONIC ACID (acidum naphthylamin-sulfonium) is described as a white powder, soluble in about 4,000 parts of cold water, but much more freely in alkaline liquids. It has been recommended as an antidote for nitrite poisoning and also as a remedy in the treatment of acute iodism. Naphthionic acid may be used in those troubles of the bladder which have their origin in the alkaliescence of the urine, since the acid possesses the valuable property of being easily dissolved in the urine and producing therein an alkaline reaction. This reaction is based upon the formation of freely soluble naphthionate of sodium by absorption of sodium from the di-sodic phosphate of the urine, and its conversion into mono-sodic phosphate. In acute iodism or chronic cystitis naphthionic acid may be given in wafers containing 8 grains each (one dose every 3 or 4 hours).

ERUPTIONS CAUSED BY ANTIPYRINE.—The antipyretic exanthem (rash, eruption), appears either distributed over the surface of the body or is more or less distinctly localized. In the latter case it shows preference for certain portions of the body, particularly natural orifices, as mouth, anus, or eye lids; further, the genitals, extremities, above all the back and palm of the hand, fingers and toes. Sometimes other parts of the trunk and the mucous membranes are attacked. Upon renewed administrations of antipyrin the exanthem always reappears at the same parts previously attacked. Strongly localized eruptions appear in form of sharply defined round or oval, red, raised spots, which are accompanied by a feeling of heat. These form pustules more or less rapidly. In the contents of these the presence of antipyrine has been proven. (Med. Woch., through Ap. Ztg.).

WINE OF GLYCEROPHOSPHATE OF IRON.—E. Merck, Darmstadt (Annual Report, 1897), finds that the precipitation of iron may be obviated in the manufacture of this preparation by the addition of a suitable quantity of glycerine. He suggests the following formula:

Iron glycerophosphate	2½ drams
Triturate and mix with	
Pure glycerine	1½ fl. ounces
Then add	
Sherry wine	33-45 fl. ounces
Digest for four hours, stirring meanwhile, then filter.	

SAL ANÆSTHETICUM SCHLEICHII is the name of a variable mixture of hydrochlorate of cocaine, hydrochlorate of morphine and chloride of sodium, which is dissolved in water and employed to induce anesthesia by infiltration according to the clinical method of Schleich. The mixture is of three different degrees of strength, the formulas for which are given by E. Merck as follows:

(1) Strong.	
Cocaine hydrochlorate	0.2
Morphine hydrochlorate	0.025
Sodium chloride	0.2
(2) Normal.	
Cocaine hydrochlorate	.01
Morphine hydrochlorate	0.025
Sodium chloride	0.2
(3) Weak.	
Cocaine hydrochlorate	0.01
Morphine hydrochlorate	0.005
Sodium chloride	0.2

Each of these mixed powders should be dissolved shortly before use in 100 cc. of boiled distilled water and these solutions should exclusively be used when cold, as otherwise their anæsthetic properties are lost.

PREPARATION OF MILK SUGAR.—A practical process is described by G. Irin. Fresh milk, from which no milk sugar is as yet disappeared through alcoholic fermentation, is evaporated to 20-30° B., and drawn off into crystallizing vessels, in which it is allowed to cool. The mass of crystals, which separates within twenty-four hours, contains about 88 per cent. of pure milk sugar and 12 per cent. of water, salts and albumins. The mother liquor contains about one-third of the total milk sugar, which is obtained by introducing steam to coagulate albumen, filtering through cloths, concentration and crystallization. The residual mother liquor can be used as fertilizer, as it contains large quantities of phosphates and nitrogenous matter. Purification of the crude sugar is effected in jacketed kettles, in which it is dissolved in water to a strength of 13-15° B. This solution is decolorized with boneblack, the albumens precipitated with acetic acid and the phosphoric acid with magnesium sulphate. After warming to 105° it is passed through filter presses, then concentrated to 35° B. and crystallized. The mother liquors are removed from the crystals in centrifugals. (Südd. Ap. Ztg.).

USES OF IOD-VASOGEN.—Friedlander (Klin. Wochsch.) reports the experiences with the application of iod-vasogen extending over one year. It is prepared in three strengths, containing 6, 10 and 20 per cent. of iodine, respectively. According to the author, the last two have no particular advantage over the first, though the strongest one may be used for obtaining light caustic effects. The conclusion is drawn that iod-vasogen may be substituted in most cases for the customary preparations of iodine, either internally or externally, and that the substitution has distinct advantages. Externally it may be used in place of tincture of iodine, for the skin or mucous membranes, and internally in place of iodides and cod liver oil. Good results have also been obtained by other observers. Senator mentions particularly that it is borne much better externally than tincture of iodine. That iodine is absorbed is readily proved by reactions for iodine in the urine, after a few applications. Internally he used the 6 per cent. preparation in place of potassium iodide, in doses of 5 to 10 drops several times daily in milk. Kleist gave 15 to 20 drops three times daily, gradually increasing or decreasing the dose by 2 to 5 drops. (Ap. Ztg.).

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Queries From Non-Subscribers Not Answered.

The above caption will explain to Geo. B. Gates, Portland, Me., and John Bolen, this city, why their queries have not been answered. This department is maintained exclusively for subscribers and their clerks.

Camphor Cream.

(M. W. B.) See this journal, February 3, 1898, page 175.

Formulas for Proprietary Preparations.

(E. L. M. and E. S. E.) We cannot give the formulas for the proprietary preparations you name.

Per Algetta.

(H. B.) "Per Algetta" is a fake "egg preservative" exploited from New Concord, O. See this journal, April 7, 1898, page 512.

Solution Peptonate of Iron and Manganese.

(E. V. P.) See formulas under the title "Liquor Ferro-Manganii Peptonati," this journal, August 26 and December 23, 1897, pages 272 and 957 respectively.

Dealers in Old Patent Medicines.

(H. B. McG.) S. R. Fell & Co., Cleveland, O., and E. J. Moore & Co., No. 216 Front street, this city, are dealers in old patent medicine stocks. See their cards in the advertising pages of this journal.

Ammoniated Tincture of Quinine.

(R. J. L.) Ammoniated tincture of quinine is official in the British Pharmacopœia. The formula is as follows:

Quinine sulphate	16 grains
Solution of ammonia	2½ fl. ounces
Proof spirit	17½ fl. ounces

Dissolve the sulphate of quinine in the spirit with the aid of a little heat, and add the solution of ammonia. Dose ½ to 2 fluidrams.

Elixir Calisaya With Tincture Chloride of Iron.

(T. S. P.) Try the following:

Tincture citro-chloride of iron, N. F.	640 minims
Detannated elixir of calasaya, N. F.	enough to make..... 1 pint

Mix and filter.

Each fluid dram of this elixir represents about two-thirds grain of ferric chloride and about three-quarters of yellow cinchona.

Elixir Lactated Pepsin With Calisaya, Iron and Bismuth.

(T. S. P.) An elixir containing these substances may be prepared with compound elixir of pepsin of the National Formulary, as follows:

Quinine sulphate	16 grains
Cinchonidine sulphate	8 grains
Cinchonine sulphate	8 grains
Bismuth and ammonium citrate	16 grains
Water of ammonia	a sufficient quantity
Soluble ferric phosphate, U. S. P.	32 grains
Hot water	1 fl. ounce
Compound elixir of pepsin, N. F.	enough to make..... 1 pint

Dissolve the alkaloidal salts in 8 ounces of the compound elixir of pepsin and to the solution add the bismuth and ammonium citrate dissolved by the aid of a little water of ammonia in ½ fluid ounce of the hot water. Dissolve the soluble ferric phosphate in the remainder of the hot water and add to the solution first made. Allow

the mixture to stand a short time, and filter. One fluid ounce of this elixir contains 1 grain of quinine sulphate, $\frac{1}{2}$ grain each of cinchonidine and cinchonine sulphates; 1 grain of bismuth and ammonium citrate and 2 grains of soluble ferric phosphate.

Graduate or Graduator.

(M. T.) has been called upon to decide the question whether it is correct to say "graduate" or "graduator" in naming the ordinary glass measures with quantities marked on the side. He wants an opinion.

"Graduate" is the name to use. Both words are derived from the Latin "gradus," a step, and while there may be some etymological reasons for using the word "graduator" in this connection, modern usage has decreed otherwise. The term "graduate," a glass vessel upon which the divisions of liquid measure have been marked, is of comparatively modern origin. The termination "or" annexed to words of Latin origin generally denotes an agent and "graduator" may be correctly employed to denote (1) one who graduates; as a graduator of mathematical instruments; (2) an instrument for dividing any line, right or curve, into small regular intervals; (3) a vessel for accelerating the formation of vinegar by arrangements to diffuse the liquid over a large surface, so as to secure rapid acetication, in consequence of exposure to air (Webster, Ure, and others). "Graduate" as a verb may be either transitive or intransitive.

Face Powder.

(T. S. P.) A formula for a "model" face powder may be found in this journal, September 2, 1897, page 301. Here are some others:

(1) Zinc oxide	1	ounce
Precipitated chalk	6	pounds
Powdered talc	1	pound
Corn starch	2	pounds
Extract of white rose	1	ounce
Extract of jasmine	1	ounce
Extract of orange flower	1	ounce
Extract of cassia	1	ounce
Extract of musk	$\frac{1}{4}$	ounce

If this powder be too light, a portion of the precipitated chalk may be replaced with prepared chalk.

(2) Magnesium carbonate	$\frac{1}{2}$	pound
Powdered talc	1	pound
Oil of rose	8	drops
Oil of neroli	20	drops
Extract of jasmine	$\frac{1}{2}$	ounce
Extract of musk	1	dram
(3) Corn starch	7	pounds
Rice flour	1	pound
Powdered talc	1	pound
Powdered orris	1	pound
Extract of cassia	1	ounce
Extract of jasmine	1	ounce

Mix thoroughly and pass through a 100-mesh bolting-cloth.

(4) Zinc oxide	4	ounces
Rice powder	14	ounces
Precipitated chalk	4	ounces
Talcum powder	2	ounces
Orris root, powder	2	ounces
Perfume	sufficient	
(5) Zinc oxide	2	ounces
Orris root, powder	2	ounces
Rice flour	16	ounces
Oil of rose	3	drops
Oil of rose geranium	3	drops
Oil of ylang ylang	1	drop
Coumarin	$\frac{1}{4}$	grain
Acetic ether	10	drops

Mix the first three ingredients; mix the other ingredients so as to dissolve the coumarin, and incorporate this mixture with the powder.

Ferrated Wine of Cinchona.

(O. M. A.) There are a number of formulas for a preparation of this character, none of which seems to possess substantial superiority over the bitter wine of iron of the Pharmacopoeia or the ferrated elixir of callosa of the National Formulary. However, here are several formulas:

(1) Cinchona bark, in powder	1	ounce
Proof spirit	1	fl. ounce
Glycerin	1	fl. ounce
Brandy	1	fl. ounce
Simple syrup	9	fl. ounces
Distilled water	9	fl. ounces
Sherry wine	16	fl. ounces
Citric acid	10	grains

The bark is macerated for two days in the water and proof spirit; it is then subjected to pressure and one ounce more spirit and nine ounces of water are poured over the residue, and again expressed. The fluids are mixed, evaporated to two ounces, set aside in the cold for about two days, then filtered and evaporated to a thin extract consistence. The extract is then dissolved by gentle heat in the glycerine, syrup and citric acid, and then the sherry wine and brandy are added. Set aside for a fortnight, and filter. Now take of

Citric acid	4	grains
Ammonio-citrate of iron	$\frac{1}{2}$	drams
Cinchona wine (as above)	1	pint

Mix, and allow to dissolve in the cold; set aside for a fortnight before filtering.

(2) Detannated tincture of cinchona, N. F.	$\frac{1}{4}$	fl. ounces
Aromatic spirit	2	fl. ounces
Syrup	4	fl. ounces
Purified talcum	120	grains
Detannated sherry wine, enough to make	16	fl. ounces

Mix the liquids, allow the mixture to stand one day or longer if convenient, then incorporate the purified talcum and filter through a wetted filter, returning the first portions of the filtrate until it runs through clear. To the wine of cinchona thus prepared add

Soluble ferric phosphate	128	grains
Dissolved in boiling water	4	drams

Allow to stand 12 hours and filter.

(3) Sulphate of quinine	1	grain
Sulphate of cinchonidine	8	grains
Sulphate of cinchonine	8	grains
Citric acid	1	ounce
Ammonio-citrate of iron	$\frac{1}{2}$	drams
Aromatic spirit	1	fl. ounce
Sherry wine, detannated, enough to make	16	fl. ounces

Liquor Ferri Albuminati.

(O. M. A.) The following formula is official in the German Pharmacopoeia:

(1) Dried egg albumen	35.0
Water distilled	1000.0

Dissolve, strain and pour, in a thin stream, into a mixture composed of

Solution ferric chloride, s. g. 1.280 (G. P.) ..	120.0
Water, distilled	1000.0

In order to precipitate completely the iron albuminate formed, add just sufficient of solution of sodium hydrate (15:100), diluted with 20 parts of water, to neutralize the liquid. Wash the precipitate repeatedly by pouring on water and again decanting, until the wash-water turns but slightly opaque by the addition of silver nitrate, after rendering faintly acid with nitric acid. Collect the precipitate in a straining-cloth and transfer to a sufficiently large tared bottle. Then add:

Solution sodium hydrate, s. g. 1.170	3.0
Water	50.0

Agitate, and, after solution has been effected, add

Alcohol, s. g. 0.830	150.0
Cinnamon water	100.0
Aromatic tincture, G. P.	35.0
Water, enough to make	1000.0

Hager gives the following:

(2) Dried egg albumen, in coarse powder	35.0
Water, tepid (40° C.)	300.0

Dissolve, strain, and to the liquid, warmed to 49° C., add, stirring frequently,

Dialyzed iron	120.0
Water	240.0

And then quickly add

Solution sodium hydrate, s. g. 1.160 and free from carbonate	7.0
Water	100.0

Immediately shake the mixture violently. Then set aside, protected from light. After the sediment has been nearly all dissolved add the following, previously mixed:

Oil of cinnamon	0.3
Aromatic tincture, G. P.	5.0
Cognac brandy	50.0
Alcohol, 90 p. c. (weight)	100.0
Water, enough to make	1000.0

(3). The following formula has been proposed by E. Dieterich: Dissolve 3 parts of egg albumen in 30 parts of cinnamon water. Dilute 12 parts of the solution of oxychloride of iron with 40 parts of distilled water and add 12 parts of alcohol. Now mix the two solutions, immediately add 0.75 parts of solution of soda, and set aside. After several hours filter the liquid through a pellet of

cotton and then pass enough water through the latter to make the product weigh 100 parts. By using only 2½ parts of albumen a more handsome product is obtained; or by using 5 times as much fresh egg albumen, the solution turns out more clear and transparent. The solution of oxychloride of iron and the other preparations used in making this solution are those recognized by the German Pharmacopœia.

Foot Rot in Sheep.

(J. F. R.) Opinions differ somewhat concerning this disease. By some two forms are recognized, sporadic and contagious, while others consider them the same, differing only in degree. The sporadic or non contagious diseases may be produced by foreign substances getting between the hoofs and causing inflammation of the space between them. If not checked, the whole foot will become involved and the hoof will drop off. The same result comes from putting sheep accustomed to high pastures upon low, mucky ones. Their hoofs grow too long and afford opportunities for collection and adhesion of materials causing decay and the subsequent inflammation. Usually the front feet are the first to be affected, and examination will show them to be inflamed, hot, and feverish. To treat the disease remove all superfluous horn from the hoof, cleanse thoroughly, and apply butter of antimony to the inflamed part. Keep the feet clean by washing with water containing blue vitriol or copperas, one part to twelve parts of water. One part of carbolic acid to 150 of water may be added. The animal should be carefully looked after and fed. In the contagious form the cause is said to be a specific poison, which may be introduced into a flock in various ways from infected stock. Lameness will be noticed in one or more feet, the foot will be found swollen above the hoof, and the spaces between the claws will be red and tender. In a few days small pimples, containing a watery fluid, will be developed. In a week or two proud flesh appears and the hoof begins to separate. At the end of about a month the hoof drops off. The disease spreads from foot to foot until all are involved, and the animal lies down to die of starvation. The specific virus oozes from the sores in the feet and may be spread in various ways. The cars in which sheep are transported are often infected. Whenever the disease appears the sheep should be divided at once into three lots—the infected, suspected and unaffected. In this way they may be better treated. The treatment is the same as for the non-contagious forms. Here are some formulas:

Lotion.

- | | |
|--------------------------|----------|
| (1) Lead acetate | 1 ounce |
| Copper sulphate | 1 ounce |
| Verdigris | 2 ounces |
| Oil of turpentine | ½ pint |
| Dilute acetic acid | 1 pint |

The powders are boiled in the acetic acid for about a quarter of an hour, and then the turpentine is added. To be well shaken before using.

Paste.

- | | |
|---------------------------|---------|
| (2) Copper sulphate | 1 ounce |
| Calcium sulphate | 1 dram |
| Sugar of lead | 1 dram |
| Gum arabic | 1 dram |
| Honey | 1 ounce |

Mix.

Apply with a soft flannel (Wise).
Ointment.

- | | |
|-----------------------------|----------|
| (3) Venice turpentine | 1 ounce |
| Verdigris | 1 ounce |
| Copper sulphate | ¼ ounces |
| Prepared lard | 3 ounces |

Mix well.

Syrups for the Soda Fountain.

(Phm. R.)

Vanilla.

- | | |
|------------------------------|-----------------------|
| (1) Extract of vanilla | 1½ ounces |
| Liquid foam | 1 ounce |
| Caramel | a sufficient quantity |
| Simple syrup | 1 gallon |

Mix and strain.

(2) According to Hiss, vanilla syrup is improved by the addition of musk. The quantity of vanilla extract may be decreased about one-half and partially replaced by tincture of musk U. S. P., using about 1 fluidram of the latter to 1 gallon of syrup. Then add the caramel and soda foam as in the preceding. Of course, if the vanilla ex-

tract already contains musk no further addition of the latter should be made to the syrup. The syrup may be still further improved by the addition of about 10 to 15 drops of lemon essence to each gallon.

Orange.

(1) Select a heavy, thin-skin, sound orange. Grate off the outer yellow rind only; pare off and throw away the inner thick rind and squeeze out the juice. Put the grated rind in a mortar with two and one-half drams of citric acid and rub thoroughly, gradually adding the juice. Strain this through flannel and mix it with three pints of cold syrup.

- | | |
|--------------------------|-----------|
| (2) Grated peel of | 8 oranges |
| Expressed juice of | 8 oranges |
| Extract of orange | ¼ ounce |
| Fruit acid | 1 ounce |
| Liquid foam | 1 ounce |
| Granulated sugar | 6 pounds |
| Water | 4 pints |

Contuse the peel (grated) with 8 ounces of sugar until the oil is thoroughly expressed and absorbed by the sugar. Then mix the remainder of the sugar with the flavored sugars, add the juice and water, dissolve by heat, strain, and when cool add the extract and liquid foam.

Blood Orange.

- | | |
|-------------------------------|------------|
| Rock candy syrup | 1½ gallons |
| Extract of orange | 2 ounces |
| Raspberry juice (pure) | 8 ounces |
| Citric acid | 1 ounce |
| Solution carmine, N. P. | q. s. |

Serve 1 to 1½ ounces, with dash of acid phosphate. in large mineral glass.

Lemon.

(1) Select one good sized lemon with thin, smooth skin. Grate off the outer yellow rind only; pare off and throw away the inner thick rind and squeeze out the juice. Put the grated rind in a mortar with three drams of citric acid and rub thoroughly, gradually adding the juice. Strain through flannel; add three pints of syrup and mix. This makes a fine fruity lemon syrup.

- | | |
|---|--------------|
| (2) Oil of lemon, perfectly fresh | 1 fl. dram |
| Alcohol | 1 fl. ounce |
| Citric acid | 180 grains |
| Water | 2 fl. ounces |
| Simple syrup | 3 pints |
| Mucilage of soda foam | Sufficient |
| Water, enough to make | ½ gallon |

Dissolve the oil in the alcohol and the acid in the water; add both to the syrup, and then add the foam and water. This syrup should not be kept longer than a week.

Other formulas for soda fountain syrups may be found in previous volumes of the Era. Consult the indexes.

A NEW REMEDY FOR THE OPIUM HABIT.

The "New York Medical Journal" comments upon a remarkable discovery said to have been made by Dr. W. W. Winthrop, of Fort Worth. When Dr. Winthrop was living in Florida he became acquainted with a negro, who would allow himself to be bitten by any snake that a person might bring him. After being bitten, the negro would take a mouthful of some herbs, which he carried in a little bag, and which he maintained antagonized the venom. By judicious use of money and whiskey Dr. Winthrop obtained a clue to the herb used by the negro, and with the help of a Scotch botanist came to the conclusion that the plant used was *Viola sagittata*, too sparsely known in Florida as *Husa*. Dr. Winthrop states that he has tested the plant and, without aspersing its virtues as an antidote to snake venom, has found that it is an infallible cure for the opium habit. He records the experience of other physicians, one of whom claims to have cured himself of the opium habit after twenty-three years' addiction to it. Med. Age says that the virtues of *Husa* will undoubtedly be systematically investigated, and in the meantime the claims that have been made for it will be accepted with wise discrimination.

GUAIACOL PHOSPHITE was introduced by Ballard (Rep. de Pharm., Merck's Annual Report), as a therapeutic agent under the name of "phospho-guaiacol." It is described as a white crystalline powder possessing a sharp taste and an indifferent odor. It is soluble in water, dissolves very freely in alcohol, ether, chloroform, acetone, benzene, toluol and the fatty oils. It is but sparingly soluble in oil of turpentine and glycerine. Its melting point is 77.5° C., and it contains 92.25 per cent. of guaiacol. It has not been tested clinically.

THE PHARMACEUTICAL ERA

[WEEKLY]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XIX.

NEW YORK, JUNE 30, 1898.

No. 26.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 753.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL..... 973	Park Company Wins a
The Professional Poisoner..... 975	Point: New York Board
Removal of Tattoo Stains..... 976	of Trade and Transporta-
ERA COURSE IN PHAR- MACY..... 977	tion Commends Presi-
Pharmaceutical Processes..... 977	dent and Congress: Re-
Close of the First Year of the Era Course in Phar- macy..... 979	strictions Upon Licensed
Leads and How to Pre- vent Them..... 980	Druggists..... 982
Pharmacy on a British Troopship..... 983	Apothecary in U. S. Service..... 993
News from Great Britain..... 984	News Letters..... 994
Power from Liquid Air; Krypton and Neon..... 985	Pennsylvania and Mary- land Pharmacists Hold
QUESTION BOX..... 986	Joint Meetings..... 999
PHARMACY..... 988	Connecticut Pharmaceuti- cal Association..... 1001
NEWS AND TRADE DE- PARTMENT..... 989	Colorado and Georgia As- sociations..... 1002
The War Revenue Law; No Extension of Time on Stamp Tax; Work of Pre- paring the Stamps..... 989	New York College Trans- fers Its Mortgage; Com- mencement Northwestern University..... 1003
How Manufacturing Phar- macists and Proprietors View the Stamp Tax..... 990	BUSINESS RECORD..... 1004
Manufacturing Perfumers Will Advance Prices; Stamp Tax Regulations in Great Britain..... 991	PATENTS, TRADE MARKS, ETC..... 1004
	DRUGGISTS' ADVERTISE- MENTS..... 1005
	ING..... 1005
	Pharmacy in Australasia..... 1007
	OBITUARY..... 1008
	BOOK REVIEWS; New Books, ETC..... 1010
	Torrey Botanical Club..... 1019
	STATE OF TRADE..... 1011
	MARKET REPORTS..... 1012

THE ERA COURSE IN PHARMACY

Consists of lectures prepared by leading pharmaceutical educators, and published weekly in The Pharmaceutical Era. Quizzes and Examinations are conducted by mail. Question blanks upon each lecture are sent to students, and their answers duly rated are returned with corrections by the instructors.

The course is graded and covers in scope all the subjects included in the college curriculum. The course is divided into two years, junior and senior, of about 40 weeks each.

More than 1,000 Students in the junior class for 1897-98. Send for full Prospectus, now in preparation, giving details of courses, manner of conducting it and terms for tuition, etc.

Address,

THE PHARMACEUTICAL ERA.

Box 1483, New York.

The War Tax on the Drug Trade.

The War Revenue Stamp Tax on proprietary medicinal articles goes into operation to-morrow, July 1. From this time forward, all such articles "sold or removed for sale" as have or are claimed to have any medicinal property, and in which the maker has any proprietary right, must bear the revenue stamp of the United States Government. At the start, unavoidably it seems, considerable difficulty will be experienced in applying and administering the law. The wording of the measure is not so clear as it might be. Uncertainty exists in the minds of the manufacturers and of the Revenue Collectors alike concerning many preparations and articles. The Commissioner has been overwhelmed by thousands of letters questioning the application of the tax. He has not had time to answer the hundredth part of these, and, because of the mass of work entailed upon his bureau by this new law, his decisions are necessarily slow. The Treasury Department had no conception of the enormous quantity of stamps that would be called for by the drug trade and allied interests, and the preparations for supplying the stamps have been, so far, lamentably inadequate. The manufacturer who has made requisition for five million stamps, must be satisfied for a day or two with one-tenth of that quantity.

However, these drawbacks are merely temporary in character, and it will not be many days before the stamp tax provision is working perfectly smoothly. If the dealer has any doubt as to an article in stock, he will be on the safer side if he stamp it and raise the price accordingly.

And this brings us once more to the point of urging that the time for the retail druggist to advance prices on the patent medicines he has so long been carrying at cost or less is to-morrow morning early. If he waits fifty years, it is not at all probable that he will again have so clear and good an opportunity of doing this. Irrespective of whether the manufacturer raises his prices to the trade, this is the time for the retailer to make a final stand for legitimate prices that will give him a fair margin of profit on proprietary goods. Do not be frightened by that old bugaboo of department store competition. Raise your price on every "patent medicine" in your stock. Raise it to as near the manufacturer's advertised price as possible, and keep it there. Then, if the goods do not sell as rapidly as you think they should, devote your time and energy to something that is profitable.

Army and Navy Pharmacists.

A number of questions to be discussed at the coming meeting of the American Pharmaceutical Association at Baltimore in August have been hanging fire for some years. Perhaps the one to receive the most discussion will be the report of the committee on the Status of the Pharmacists in the United States Army, Navy and Marine Hospital Service, for, if we remember correctly, this committee by vote of

the association was continued. We believe the present a most propitious time to agitate this question, and it will be surprising if recommendations are not again made to endeavor to secure for our brethren in the service the official recognition they so justly deserve.

The nation is now engaged in a struggle to which there can be but one solution, the triumph of our arms. This accomplished, the country cannot but feel grateful to those who have fought for its cause, and therefore we believe that the present is the most opportune time for a united effort upon the part of the friends of the military pharmacists. The war has already demonstrated that we are no longer an insular nation, and that hereafter our army and navy must be larger in times of peace than they have been heretofore. The war has also demonstrated the necessity for the reorganization of many of the administrative features of various arms of the military service, the establishment of a division hospital corps being a case in point. Republics are not always ungrateful, and the time to secure the sought-for honors is during the season when honors are extended.

July 4, 1898.

There is just a suspicion that many of us for years back have been a little careless or inattentive at the annual reading of the Declaration on Independence Day. Some of us have been occupied with fire crackers or the beauties of nature, while the orators of the day have been provoking the national bird into soaring and screaming. It will be a little different upon the coming day of celebration. There will be our later heroes to exalt, possibly some lament over the vicissitudes of war, but the old Declaration will have a new significance. It will be heard by hundreds this year who have heard it for years past, and yet have not heard it. It will strike in this year, because it seems to be such a pertinent document for the attention of some people in whom we are now intensely interested—the Cubans and Filipinos.

While we are celebrating, it may be opportune for our orators to reply to some invidious remarks recently made about our newly developed greed for territory. This is a misapprehension, of course. We don't really like the idea of taking a lot of ill-favored national children to raise, but rather than see them suffer from lack of care and a good bringin' up, we are willing to take them in hand. It's for their own good. The final result may be a little business, but conquest for revenue isn't the object. This is one of the best countries on earth to be annexed to, anyway. An observant Englishman has lately told us that we are worth \$80,000,000,000 in round numbers, a figure which seems about right when it is remembered that we are not given to bragging to the tax assessor, who put the figures down at \$25,000,000,000 at the decennial round-up in 1890. Then look at our national debt taxes! Only \$15 per capita. France struggles along with a price of \$116 per head, Great Britain \$87, Russia \$30, Spain \$73, Liberia 91 cents and the Fiji Islands \$5.

This mention of taxes reminds us of a present day incident of our Spanish war. All this kicking about stamp taxes is simply a manifestation of the natural tendency of man to evade taxes if he can. Where countries are run on a free-and-equal plan, this tendency is obvious. The aversion to tax paying is solely on account of the fear that some other freeman is not paying his share, and you're paying too much. There are undoubtedly thousands of people in this country who would go to the front and spill buckets of gore and strike till the last armed foe expired rather than pay such playune things as poll taxes, dog taxes and stamp taxes. The real trouble with

such taxes is the worry, not the amount of the tax. We are too busy to enjoy stamp licking, and would really prefer to issue bonds for our heirs and assigns to pay if it wasn't for the looks of the thing. We paid a billion dollars in thirty years, with about 70 per cent. of our present population, and 25 per cent. of our present national wealth, and it wasn't much of a strain. A few hundred million of dollars with an indemnity in sight need not worry us now.

Index of Volume XIX.

With the present number terminates the half-yearly volume of this publication. The record shows a healthy progression and advancement, and, also, that the Era is more than ever what it has always claimed to be, a strong, energetic and reliable pharmaceutical journal. At no time has personal feeling or bias been allowed to influence what it has had to say; its utterances have been made with candor and due regard for the feelings of those whom it seeks to best serve, and its blows have been struck straight from the shoulder. It is a pleasure, therefore, for us to thank our many patrons for the kind words of appreciation they have so generously given us, as well as their hearty co-operation in many other ways. We promise them to put forth our best efforts to make succeeding issues still more attractive, brighter, better, and most of all, more utilitarian than ever.

The index for this volume (No. XIX.), now in the course of preparation, will accompany our next issue. Look for it.

The Early Manufacture of Mineral Waters in the United States.

In reading the article in our last issue upon the origin of artificial mineral waters, which shows very conclusively the important part taken by Thomas Henry in the development of what is to-day a great industry, we were led to inquire into various phases of the subject which may be not wholly without interest.

Supplementing Mr. Kirby's historical sketch, it is to be noted that the value of "water impregnated with fixed air" was well known in this country before the beginning of the present century, and in the early dispensatories, formulas are given for its preparation, most of them being based upon or copied from the formula in the Dublin Pharmacopoeia. The apparatus of Noth, as noted in Mr. Kirby's article, was the one generally recommended for its preparation, though for large quantities, that of Woulfe, or some modification of it, was employed.

To quote Thacher's American New Dispensatory, first published about 1810, the manufacture of mineral waters upon "correct chemical principles," was undertaken in America at New Haven, Conn., about 1806, and during the summer of 1808 a public establishment for this purpose was opened at the same place under the direction of Prof. Silliman. An establishment of the same kind and under the same direction was started in New York in April of 1809 by Noyes, Darling & Co. Fountains of Ballston, Soda and Seltzer waters were opened in the bar of the famous Tontine Coffee House. The arrangement of the apparatus is thus described: "The cisterns are placed in the cellar, and the waters are conveyed into the bar in block tin tubes, which pass up into mahogany pillars, crowned with gilt urns, lettered with the names of the respective waters. The pillars, with their urns, stand a foot apart, and the middle one is raised above the others; silver stop-cocks inserted into the sides of the pillars, give the whole much neatness and richness of appearance." We are further informed that the proprietors of this establishment intended to open fountains at the City Hall "in the month of May, in a

spacious room, fitted up and ornamented in handsome style, and adapted to the accommodation of ladies as well as gentlemen. The Ballston and Seltzer waters are prepared according to an accurate analysis; and in order to give the soda water its proper efficacy, it is made with the full proportion of soda directed by the dispensaries. The waters are bottled for exportation, in any quantity desired."

These statements are very interesting reading, from the fact that they are side lights thrown on the business by a contemporaneous observer, who, it is proper to say, made use in his work of the famous "Conversations on Chemistry." Soda water was also made in New York about the same time by a Mr. Usher. It was sold both from a fountain and in stone bottles and had a "good reputation." It was also extensively used in Philadelphia, where there were one or more manufactories, and in Boston there was a public establishment of a similar nature conducted by Mr. John P. Whitwill.

So much for the early pioneers of the mineral water industry in this country. They preceded the inventor of the marble soda fountain apparatus by nearly half a century. It is claimed by some that bottling of syruped soda water was introduced into this country by Eugene Roussel, a Frenchman, who kept a perfumery store in Philadelphia about 1838 or 1839. The first syrup bottled with carbonated water was lemon.

We append the formula for "Aqua Aeris Fixi" (water impregnated with fixed air) taken from the Dublin Pharmacopoeia, and reprinted in the first edition of Coxe's American Dispensatory, (1806):

Take of

White marble in powder, three ounces,

Diluted sulphuric acid,

Water, of each, one and a half pounds.

Mix them gradually in a Nooth's apparatus, and let the air evolved pass through six pounds of pure spring water, placed in the upper part of the apparatus; and let agitation be occasionally employed until the water shall have acquired a sub-acid taste.

The Persimmon Tree.

Oh, a little persimmon grew high on a tree,

On a tree—on a tall, tall tree!

And a little boy said, "It is growing for me,

But I haven't a pole that can reach it," said he—

The persimmon that grew on the tree.

Oh, a little persimmon grew high on a tree—

On a tree—on a tall, tall tree!

And another boy said, "It is right overhead,

And when I grow big I can reach it," he said—

The persimmon that grew on the tree.

And while they were talking, another boy came

To the tree—to the tall, tall tree;

And he jerked his short jacket and climbed to the top.

While they shouted below: "He will drop! He will drop!"

He was fond of persimmons; he collared the crop

Of persimmons that grew on the tree!

—Atlanta Constitution.

EUPHTHALMINE SALTS.—C. Harris has prepared two salts of euphthalmine, the hydrochloride and salicylate.—Euphthalmine Hydrochloride ($C_{17}H_{21}O_4N.HCl$) has previously been obtained as a deliquescent salt, but is now prepared by repeated crystallization as a permanent crystalline powder. It dissolves in about 2 parts of boiling absolute alcohol and from this solution is thrown out, in form of globules, by addition of ether. The salt is very soluble in water and melts at 138 to $140^\circ C.$ —Euphthalmine salicylate ($C_{17}H_{21}O_4N.C_6H_5O_2.CO.OH$) is prepared by mixing ethereal solutions of euphthalmine and salicylic acid in molecular quantities and crystallization from ether-alcohol. The salt melts at 115 to $116^\circ C.$ and is easily soluble in water. (Ap. Ztg.)

THE PROFESSIONAL POISONER IN INDIA.*

BY GHARIB PARWAR.

The professional poisoner has long ceased to exist in Western Europe, but in Asia generally, and even in our wonderfully civilized Indian Empire, the art of poisoning is only too frequently adopted as a profession. The present writer has recently had an opportunity of studying the career of a pleasant-looking young Hindu, who had for several years earned a precarious living by poisoning his neighbors.

The drug in almost universal use among Indian poisoners is obtained from various species of datura, including the Datura Stramonium, or thorn apple, a plant not unknown to European criminals. It is generally given in the form of an extract mixed with sweetmeats, and acts very quickly, producing unconsciousness and the general appearance of complete drunkenness. My young poisoner was not vicious by nature, but was exceedingly lazy. He was the son of a Hindu bearer, and, as is usual in India, followed the trade of his father. He did very well at first, but took to opium smoking, and became so unreliable that one master after another dismissed him till at length he found it impossible to find employment. One day when he was journeying from one cantonment to another he fell in with a couple of professional poisoners, who inducted him into the mysteries of datura poisoning, and taught him how to prepare the fatal sweetmeats and curry which these gentry offer to their victims.

The method of preparing the poison is very simple, as the poisoners merely collect the plants, make a very strong decoction, and then evaporate it to a syrupy consistency.

They have absolutely no method in their administration of the drug, as they are apparently quite indifferent whether their victims recover from the unconsciousness which they administer the datura to obtain. Our young poisoner apparently took very kindly to his trade; for he told me that he "treated" about 500 individuals in five years! His method was very simple, and he took care to devote his attention to comparatively poor travelers, his principal victims being sepoys, muleteers, mahouts, and such like proceeding on furlough and native servants returning to their homes with their more or less ill-gotten gains. Dressed as a "jogi," or sometimes as a small merchant, he used to join with these simple people for mutual company and protection as is the custom in Eastern lands. After the evening meal he used to produce his hocus sweetmeats, which would, of course, be readily taken by his victims. They would fall asleep unsuspectingly, and while unconscious he would rob them and skip off to the nearest railway station, and be 50 miles away before his victims recovered consciousness. Many of his robberies were actually performed in the train; the fact that the Indian trains run all night being most convenient for the datura poisoner, as he can drug his companions at the evening meal, loot them comfortably as he goes along, and alight with his booty at any station he pleased, leaving his victims to awake in the early dawn "very headachey," perhaps a hundred miles away from their plunderer.

In this way Ram Bux, as the man was called, journeyed all over Northern India, poisoning and plundering as he went, till emboldened by his success he succeeded in drugging a rich merchant, who was going to Lahore to buy supplies, of nearly a thousand rupees. He went to Umbalia to enjoy his ill-gotten gains, but the merchant gave a very accurate description of his appearance to the police, and he was apprehended and brought up country to languish in Rawal Pindl Jail, where I had the pleasure of making his acquaintance.

He made himself quite comfortable in prison, accepting his reverse of fortune as the will of Khuda. He had no idea that his nefarious practice was aught but an honorable calling, and answered any question he was asked with apparent honesty.

There exists another class of poisoner in India who operates with a very simple but certain agent—namely, powdered glass. He is generally a younger son anxious

* British and Colonial Druggist.

to succeed to his brother's birthright, or an unfillal son impatient of his father's longevity.

He administers the powder in the food, and it produces a form of diarrhoea, and rapidly fatal. "Hill diarrhoea" is caused by the minute particles of mica floating in hill water.

Another form of poisoning was formerly common in India, but is luckily declining in favor, although it is still practiced in Central India. It was poisoning by means of the cobra poison. For this purpose the poison of the snake was collected and the victim vaccinated with the virus while asleep. So skilful were the practitioners of this horrible practice, that in many cases the relatives and even the poisoned individuals themselves believed that the murdered man had been bitten in his sleep. Truly what with plague, famine, and poisoners, amateur and professional, the lot of the native of Hindustan is not altogether a desirable one. I may mention that I have said nothing of the Thugs, a religious sect of murderers and poisoners, so dreaded as to have a whole Government department devoted to their care. Some day, if the editor wills, I will speak of them. I am writing in the same atmosphere as Kipling breathed, so I may be excused if I paraphrase his favorite sentence "Of the Thuggee and their ways, and Kalee their wold goddess, I would write, but that is another story."

REMOVAL OF TATTOO STAINS.

Ross Hall Skillern, M. D., contributes to the Philadelphia Medical Journal an interesting paper upon the history, manner of introduction and method of removal of tattooing. In discussing the latter portion of his subject, he says that to remove these marks successfully one should know how they have been introduced and of what the stains are composed. Red, blue and sometimes green are used; if there are other colors they are mixtures of these. The substances used are carbon, indigo, vermilion, and, in some cases, cochineal. These are pricked down under the horny layer and penetrate the true skin. The stain then remains in the true skin in the shape of minute particles of the dye. The operator must be careful not to penetrate too deeply into the cellular tissue, otherwise the lymphatics would take up the stain, carrying it to the nearest glands, possibly causing them to break down and suppurate, or at least to become reddened and inflamed. The parts are then bathed with hot water, which brings out the color more clearly. After about three days the skin scales off like bran, leaving the marks distinct. These are never irritable or sensitive, and, unless the stain be indigo or vermilion (cinabar), will, if properly introduced, remain there, unless disturbed, until death. (Cinabar, or vermilion, and indigo, disappear after the lapse of years, as they undergo chemical changes and become absorbed).

As mentioned, the substances used being for the most part carbon, it naturally would not be a difficult matter to effect their removal by something that would either bleach, or, better still, digest them. Hydrogen dioxide, pyrozone or hydrozone, which are essentially the same drugs, having precisely the same chemical constituents, combined in the same proportions, have been used to remove these marks. They all act by bleaching the coloring matter, and are often ineffectual. Brault recommends retattooing the part with 30 parts zinc chloride and 40 parts of sterilized water, but this seems too severe a method, because the zinc chloride in such strength would act as a powerful caustic, causing sloughing of the tissues and great pain, and in the end leaving a cicatrix which would be as disfiguring as the original tattoo, if not more so. Minnie states that in order to remove the tattoo marks the skin is to be washed with a concentrated solution of tannin, and pricked with needles. Into the punctures is thrust a sharp-pointed stick of silver nitrate, causing considerable pain. Silver tannate is formed under the skin, and the tattoo-pigment is gradually eliminated. The use of glycerole of papain, as has already been suggested by Ohmann-Dumesnil, Nelson and others, is probably the easiest, least painful and most efficient method that is at present used. The technic of the operation is extremely simple, and a large area may be gone over in one sitting. As asepsis plays

an important role in the result of this operation, the parts should be prepared in the ordinary manner as for any surgical operation, viz., shave the part, if necessary; wash with soap and water, alcohol, and lastly mercuric chloride 1:1000. The instruments necessary are three or four very fine cambric needles, which may be grasped by a needle holder and placed side by side in close proximity. These should also be made aseptic. The parts are now anesthetized by a spray of ethyl chloride; this being better than hypodermics of cocaine, because it is not necessary to go deeply into the tissues, and the area to be operated on will in all probability be greater than even two or three hypodermics of cocaine would cover. Enough glycerole of papain is poured on the skin to cover those parts of the marks to be operated on. This is now worked into the tattoo marks by pricking with the needles, and should only go deep enough to draw a small quantity of blood. The marks should be gone over several times, going well to the outside to make sure all parts have been reached, followed by a dressing of glycerole of papain, gauze and adhesive plaster. This dressing should be allowed to remain undisturbed for two or three days, and at the end of that time the parts should be examined. After the dressing has been removed, the marks will be found, on superficial examination, not to be much changed, and there will be a slight area of inflammation where the needles have been introduced. On closer examination small portions of the marks will be noted as beginning to disappear; the surface should again be covered with a strip of adhesive plaster and examined in two or three more days. The marks will then be obviously disappearing, the skin presenting a hazy blue color, but in no portion can the marks be made out distinctly. The surface is slightly raised, much resembling a superficial burn. In a few days crusts will form where the needles have penetrated the skin, and when these fall off the marks will have for the most part disappeared. In some cases in which the marks are very dense, it is necessary to go over the parts twice, the second time usually removing them completely.

NEW METHOD OF DISINFECTION.—R. Walther and A. Schlossman (J. tur Prakt. Chem., Jour. Soc. Chem. Ind.) give the following details of a new method of disinfection: By means of a specially constructed apparatus a mixture of formaldehyde and glycerine is sprayed into a room which is to be disinfected, until a thick fog results; about four pounds of the mixture are needed per 1,000 cubic feet. The room need not be hermetically closed during the operation, as the ordinary circulation of air assists in spreading the disinfectant and in enabling it to reach remote corners. Three hours' exposure was found sufficient to kill all germs in the rooms experimented on, though the test objects were purposely chosen of the most refractory nature. For example: Pieces of linen thickly coated with a paste of white of egg and garden soil, dried in an incubator; layers of soil 3 or 4 mm. thick with potato skins under and above them; potato skins alone. These were placed, open and covered, at various heights in the room, in recesses in the wall, on the floor, under pieces of furniture, in tumbler-glass cylinders, or in shorter cylinders under a layer of wadding, in the pockets of thick winter clothing; faces were also sterilized by this exposure. Live guinea pigs and rabbits were also found to be freed from bacteria in their skins, their bedding straw and their excrement. The authors attribute the very advantageous effect of adding glycerine to the formaldehyde, to its hygroscopic character and its power of adhering to and penetrating most of the ordinary porous materials found about a household. They anticipate that it may be found possible to diminish still further the necessary duration of the period of disinfection, and that their method will become a much more powerful agent than any yet known against the spread of infectious diseases, not only in man, but in the lower animals.

ERNOL is a cure for chills, consisting, according to E. Krug, of extr. cerevisia, 100 p.; ext. fluid. plant. 5 p.; adeps lane 25 p.; ammonichthyl 5 p.; ol. petrol. 10 p.; ungt. paraff. 50 p.; ol. menth. pip. 1 p. (Ph. Zig.)

The Era Course in Pharmacy

J. H. BEAL, Sc.D., Ph.G., Director.

CONTRIBUTORS

Elias H. Bartley, B.S., M.D., Ph.G.	John Uri Lloyd, Ph.M., Ph.D.
Virgil Coblentz, A.M., Ph. M., Ph.D., F.C.S.	Oscar Oldberg, Ph.D.
Wilber G. Compher, A.M., M.D.	Charles W. Parsons, Ph.C.
Albert E. Ebert, Ph.M., Ph.D.	Edgar L. Patch, Ph.G.
James M. Good, Ph.G., M.D.	George F. Payne, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D., Ph.C.	T. D. Reed, M.D., C.M.
Charles F. Heebner, Phm. B., Ph.G.	Edsel A. Ruddiman, Ph.M., M.D.
George B. Kauffman, B.Sc., Phar.D.	Henry H. Rusby, M. D.
E. J. Kennedy, Ph.C.	L. E. Sayre, B.S., Ph.M.
Henry Kraemer, Ph.G., Ph.D.	Wilbur L. Scoville, Ph.G.
Edward Kremers, Ph.G., Ph.D.	William Simon, Ph.D., M.D.
	F. E. Stewart, M.D., Ph.G.
	Julius W. Sturmer, Ph.G.
	Frederick J. Wulling, Ph.G.

THE ERA COURSE IN PHARMACY is a thorough, practical and economical course of home study in pharmacy, and covers the subjects usually embraced in the curriculum in a standard college of pharmacy. It is designed for all who desire systematic instruction in pharmacy; for clerks who cannot attend college, for those preparing for pharmacy board examinations; as auxiliary course for students in college, and as a means of review for graduates and experienced pharmacists.

THE LECTURES are published weekly in THE PHARMACEUTICAL ERA, and the QUIZZES and EXAMINATIONS are conducted by mail. A separate question blank is issued on each lecture and sent to each matriculate, his answers are duly rated by the instructors and returned to the student with corrections and notations.

THE ENTIRE COURSE covers a period of two years, and DIPLOMAS are issued to all passing final examinations. Each year is divided into two terms. The first term of the Junior year began September 2, 1897, and ended January 21, 1898; the second term began February 17, 1898, and will end June 30, 1898. The junior class for 1897 is now closed.

FEES The entire expense is only \$8.00 per annum, and includes subscription to the ERA, tuition fees and a binder for preserving copies and lectures.

LECTURE No. 82.

Pharmaceutical Processes.

The Art of Percolation.

JOHN URI LLOYD, PH. M., PH. D.

General Remarks.—The beginning of our work in modern galenical pharmacy, regardless of the products to be obtained, is usually connected with the art of percolation. The abstraction of drugs in the making of alkaloids, glucosides, resins, and plant constituents generally is accomplished by means of percolation. Tinctures, fluid and solid extracts, and similar preparations in which liquids obtained from drugs are acted upon by a menstruum and used in substance as medicines, are now generally made by percolation.

Thus it is that whether the object be to isolate a simple plant constituent, or to make a complex solution of many plant constituents, the art of percolation may be employed.

Definition of the Word.—The general dictionary definition of the word percolate, is synonymous with that of filtration. Thus, impure water may percolate through sandstone, and by this act many impurities may be separated from it. The term Filtration is, it will be seen, also then appropriate. In the sense that the liquid or menstruum moves slowly through the interstices of a drug, the act of percolation is that of filtration.

But, nevertheless, in pharmacy the two terms carry different meanings. Percolation is the act by which the plant menstruum passes through a comminuted drug, the object being to abstract from that drug such constituents as may be soluble therein. Filtration in pharmacy is the act of allowing a solution or liquid that is charged with dissolved or suspended substances to pass through a clean medium, the object being to separate its impurities. In reality, the expressions percolation and filtration carry then in pharmacy the opposite of meanings, and yet, the process of percolation cannot be separated from the process of filtration.

History of Percolation.—Percolation is by no means a new art. It is as old as the making of saltpeter from earth, or of potash salts from ashes. But in pharmacy the application of the art is comparatively modern. In the very beginning of this century (1813), it was applied by Count Rumford in the making of coffee, and very soon afterward it crept into medicine. Cinchona was abstracted by it in England in 1817 by Mr. Johnson and in

1833 and 1834 Messrs. Boullay wrote a description of the method as applied to the filter press of Count Real, the term Displacement being used. It came into conspicuity in France at once, and was made official in the United States and the Edinburgh Pharmacopoeias in 1840. The art since 1858 has become a favorite here and possibly has been studied more closely in America than elsewhere. At least we have contributed our share towards its development.

The Percolator is the vessel which contains the powder to be abstracted. Originally, little attention was given its shape or relative dimensions, glass funnels usually being employed in pharmacy as percolators. Great care, however, is now taken in selecting percolators of size and shape appropriate to the substance to be abstracted.

Percolators are tall cylinders, (Figs. 61 and 62) and for working ordinary amounts of drug are made of glass. They are furnished with a tubular outlet at the bottom, the flow of liquid being regulated by a cork or a constricted rubber tube. For working large amounts of drug the height is less in proportion to the diameter than it is with small percolators. Percolators employed in factories are made of copper, tin or wood, and are often known as leaches. (Fig. 63).

The Percolate is the liquid that has passed through the drug. It should contain the soluble constituents of the drug. The percolate is usually highly colored, and in successful percolation is very concentrated at first, gradually becoming less charged with dissolved materials as the liquid passes from the exit. For this reason the first part of the percolate is "reserved" if evaporation of any part is necessary.

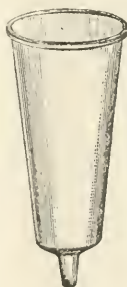


Fig. 61.—Common Cylindrical Percolator.

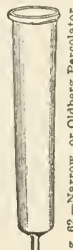


Fig. 62.—Narrow, or Oldberg Percolator.

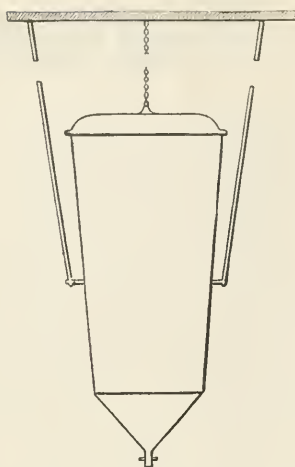


Fig. 63.—Large Laboratory Percolator.

The Menstruum is the liquid employed in abstracting the soluble principles from the drug. It may be made of one liquid or of mixtures of liquids. Sometimes acids, alkalis, or salts are added and thus become a part of the menstruum. The menstruum varies in accordance with the nature of the drug constituents to be dissolved. In some cases one menstruum may be employed to abstract certain constituents, and then by a change of menstruum another class of constituents may be abstracted from the same drug. As a rule, however, the manipulator aims to select a menstruum that is best adapted to dissolve either one constituent or a number of soluble substances, among which a limited number only are possibly of value in therapy. The success of percolation depends largely on the selection of the appropriate menstruum.

The Art of Percolation.—Persons possessed of the greatest experience have, as a rule, a deeper regard for the principle of percolation than have those of little personal experience in manipulation. Those who meet the problem in a broad sense appreciate the fact that carelessness or ignorance in the operator is likely to be followed by failure or defective results. Indeed, in the hands of inexperienced persons, the process of percolation may become a source of harm as compared with maceration in similar hands. To state it plainly, the opportunity for injury to the product is greater with an ignorant or careless person who essays percolation than it is when he adheres to the process of maceration. However, with a careful operator the most economical return for labor and materials comes from the art of percolation.

Possibilities in Percolation.—It is established by usage that with fluid extracts the finished product should practically represent the drug. It is possible by artful arrangement of drug and powder to produce a percolate that may be even more concentrated as concerns the constituents soluble in the menstruum than was the same weight of the original drug. In such cases, however, the concentrated percolate is from the first part that passes and is less in weight than the drug operated upon. It is also possible, where the drug constituents are known, to so average the percolate that by suspending the operation at a given point, any reasonable strength of percolate may be attained. Thus, by using the proper menstruum and powder, under careful manipulation, the operation may be suspended at a point where the percolate, mixed, will represent the drug weight for weight, (Fluid Extract strength, practically) or any amount less than that. Thus without any evaporation whatever, preparations equal to the standard official fluid extracts may be made superior even to fluid extracts in some respects; or, preparations of the drug strength of tinctures. It is possible by atten-

tion to details to save much expense in the case of cheap drugs by this saving of labor and waste in the evaporation of the weak percolate.

Carelessness of Operator.—The man who has a slight opinion of the art of percolation is abroad in the land. Such men think that percolation is the art of saving time and trouble and they make it serve their purpose. Said a druggist in the writer's hearing, "this process of percolation is a great process. I made a pint of Tincture of Aconite in ten minutes to-day, whereas it would have taken fourteen days by maceration." Such men as these do not appreciate a beautiful study, a study that properly made credits and enriches pharmacy and that abused injures pharmacy. In the hands of such men percolation is a harm, for, if that man had put his powdered (ground) aconite into a jar with his menstruum and had shaken the mixture daily for two weeks, and then filtered the liquid therefrom, he would have obtained a good tincture. As it was he abused the confidence of his patrons.

The man who proposes to practice shiftless pharmacy will do better to use maceration than percolation.

Conditions Governing the Product.—Fineness of powder, menstruum, height of powder in percolator, packing of the powder, rapidity of flow of percolate, temperature. To all these factors the operator must give heed if he proposes to credit himself.

Thus, a coarse powder through which the menstruum flows rapidly furnishes a weak percolate. A shallow powder that affords but little contact between menstruum and material lessens the value of the percolate. A loosely packed powder, in which the menstruum passes through interstices instead of through the powder, or a powder packed unevenly, in which case channels are formed through which the liquid flows, results in disadvantage. Inattention to either of these points may prove a source of error, and he who thinks that care and preciseness are not a factor in percolation may expect that in his hands percolation will not prove successful.

Moistening of Powder.—As a preliminary step the powder must be evenly moistened with a portion of the menstruum. The object is mainly to furnish an attractive medium for the liquid and to enable the operator to pack it evenly in the percolator. In some cases, however, as with drugs that expand, and where a highly aqueous menstruum is employed, the drug should be moistened, allowed to stand for a period and then packed. Otherwise the expansion of the drug in the percolator would either burst the percolator (if glass) or pack the powder so firmly as to prevent percolation. In large amounts the pressure is considerable, and even after great care in this direction a battery of six extra large glass percolators burst in the laboratory of the writer. If the percolator is small, instead of bursting, the flow of liquid ceases. If the menstruum be alcohol, no fear of this result need be entertained.

For working moderate amounts of powder (pharmacopial quantities), the material is to be placed in a large dish and the proper amount of menstruum slowly stirred into it. A round bottomed evaporating dish or even a large tinned pan will answer. The operator can rub the powder during the addition of the menstruum with a large mortar pestle or, better, between his hands. The liquid must be rubbed uniformly into the powder, no lumps must be permitted to remain. Water or highly aqueous liquids tend to make the mixture lumpy.

In established processes, as the U. S. P. preparations, the amount of liquid necessary to properly moisten the powder is given. However, in unofficial preparations the operator must be his own judge as to the proper condition of the powder. A good rule is to note that when the moistened powder is squeezed in the hand, it should retain its form on opening the hand, producing a lump of uniform color. This rule will find few variations, but in the case of very oily seeds, for example, staphisagria, it cannot be observed.

Having moistened the powder, it must next be properly packed in the percolator.

Packing the Percolator.—Preliminary to the operation, the bottom of the percolator must be covered with an absorbent medium that will allow the liquid to pass evenly through the powder and reach the exit without obstruction. This medium should cover the entire conical sur-

face of the bottom of the percolator and a thick layer of absorbent cotton is usually most desirable. Sometimes a layer of silver sand seems to act better, a plug of cotton being inserted in the exit of the percolator.

Cover this layer of cotton with a circular piece of filtering paper cut to fit snugly over it, and then pour upon the paper a layer of moistened powder to a depth of two inches. Press this evenly and firmly, having first leveled the surface so as to prevent impaction at any point, then add another layer of powder and press it firmly in the same way. Continue adding the powder by successive portions, pressing firmly after each addition, until the powder is all in place. Then cover it with a circular bit of filter paper, weight this with a few pieces of glass, and

pour upon it the remainder of the menstruum.

This menstruum should pass evenly, in a perfect ring, slowly down through the powder. (Fig. 64.) If the moistening and packing of the powder have been properly accomplished, the circle formed by the progressive ring will strike the cotton uniformly. When the percolate begins to drop, cork the exit, cork tightly, and set the apparatus aside for the necessary period of maceration. This varies in accordance

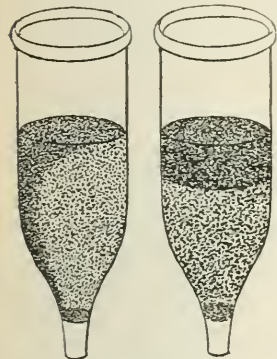


Fig. 64.—Passage of Menstruum with Proper and Improper Packing.

with the material, its fineness, and the temperature. In cold weather the menstruum has less solvent power than when hot, and as a rule percolation is best conducted in a warm room. After the period of maceration has passed, loosen the stopper in the exit and then (with official amounts) let the percolate flow, drop by drop. When the necessary amount has been obtained, reserve it and continue the percolation until practical exhaustion is accomplished. This second portion is to be evaporated to a given bulk and mixed with the reserve portion in making fluid extracts. In making solid extracts, the entire percolate is to be evaporated until the residue is of pillular consistence. In making tinctures, the amount of drug is comparatively small, and the entire percolate is used without any evaporation whatever. In the case of alkaloids and other proximate principles, the obtaining of a percolate is but the first step in a manipulative process that embraces the subsequent application of more or less chemical knowledge. Where resins are desired, the residue from the evaporation is usually poured into cold water, stirred, and the insoluble resin collected and dried. Thus the act of percolation proves to be the first step in the production of many substances widely separated in their characters.

Remarks.—First.—If a given amount of powder be packed in a percolator of six inches in diameter it will self-evidently occupy less depth than it will in a percolator three inches in diameter. If a pint of alcohol be poured

into a percolator six inches in diameter it will occupy less depth than it will in a three inch percolator. Accordingly, if identical amounts of drug be packed and manipulated in percolators of different diameters the vertical length of contact between liquid and powder increases as the diameter of the percolator decreases. Hence, a given amount of liquid will travel through fresh sections of powder and do more work if the percolator be small. For making the official amount of a fluid extract the powder should occupy a depth of not less than six inches. For making tinctures the proportion may be less, because with tinctures much menstruum is employed.

In packing the successive portions of powder, the writer prefers to use the back of his fingers. The tips of the fingers are placed against the side of the percolator, the knuckles toward the center, and thus an even pressure can be exerted. Some persons prefer a circular piece of wood.

Second.—At no time must the surface of the liquid be allowed to pass below the top of the powder. If this occur, the powder separates from the percolator by contraction and is liable also to crack. When a fresh portion of menstruum is then added it naturally passes through these fissures instead of the material.

Third.—If the operator will attach a rubber tube to the exit of the percolator and elevate the end that is free so that it is above the surface of the liquid, no time need be spent in watching the liquid in order to stop the exit when the liquid begins to drop. If a spring clip is attached to this rubber tube, the flow, when percolation is subsequently conducted, may be easily regulated. Should a cork be used to regulate the flow of percolate, a wedge shaped slice should be taken from its side previous to insertion, in which case the flow can be determined exactly.

Fourth.—With drugs that are not official and for which the operator must create or devise a menstruum, be it remembered that the nature of the drug and of the desired constituents must both be considered. It would be manifestly improper to use strong alcohol to abstract gums or to use an aqueous menstruum to abstract resins, however, owing to the fact that the substances abstracted are more or less complex, and that when dissolved they form a solvent very different from the original menstruum. To this strain of energies and subsequent endeavor to form an equilibrium is due much of the precipitation observed in percolates, the depositing of one substance altering the menstruum so that others in succession are thrown out. The operator should bear in mind then, that the menstruum poured onto the powder may exercise in two ways a solvent action very different from that of the menstruum that reaches the bottom of the powder. It may be a much better solvent for some constituents and a very much poorer solvent for others. Owing to this change in constitution in the menstruum, it may be said that at no place between the top and the bottom of the abstracting material is the liquid exactly the same either in composition or as a solvent.

Finally, while the writer is aware that the space at his command forbids him from doing more than generalize on a process that presents so much food for experiment and thought, he still believes that the suggestions made in this paper will enable any careful student to conduct percolation creditably. However, personal experience and care are necessary in order that a person may become expert; the personal equation is a prominent factor in percolation.

CLOSE OF THE FIRST YEAR OF THE ERA COURSE IN PHARMACY.

With Lecture No. 82 on the "Art of Percolation," by Prof. J. U. Lloyd, the first year of the Era Course is brought to a close. Professor Lloyd is the greatest living authority upon the subject of percolation, and his lecture, which exhibits the same pleasing style and the same talent of description that characterize his widely known literary productions, forms a fitting close to the first series of lectures.

In many respects the year has been noteworthy. The interest awakened by the Era Course and the number of students enrolled have far exceeded the expectations

which were entertained at the inception of the course. The lectures have generally been of an excellent character, and the enthusiasm exhibited by the students, as well as the genuine advancement which their recitations have evidenced, have been a constant cause for congratulation. There has been no cheap bidding for popularity by proposing to give the student an education without an earnest effort on his part to obtain it. At all times it has been maintained that the only true education is that which is obtained through unremitting, honest effort.

The object of the Era Course has been, and will con-

tinue to be, to assist earnest students to a sound and true education in pharmacy, to prepare them to meet and to cope with the difficulties of their profession, and to enable them to become successful pharmacists. For those who obtain such a preparation a Board of Pharmacy examination can have no terror.

The Era Course does not promise its members immunity from work. On the contrary, it promises them hard study, and plenty of it, believing that the young men and women who are entering pharmacy understand that an education cannot be purchased ready made, like a bale of merchandise, and they have the good sense to perceive that those who propose, for a consideration, to give the student a trolley ride through the Board of Pharmacy have a greater interest in the contents of his pocketbook than they have in his future welfare.

The second year of the course will open with the first issue of the Era in September, when both junior and senior classes will begin. Each class will receive separate lectures, with separate recitations upon the same.

As previously announced, the senior lectures will be devoted mainly to the branches most nearly allied to practical pharmacy, while the junior lectures will be devoted, as heretofore, to the consideration of general scientific subjects, but with the introduction of a number of improvements which have been suggested by the experience of the past year, and which it is thought will add greatly to the usefulness of the course and materially reduce the labors of the students in certain directions.

It is hoped that the fall term will begin not only with a large and enthusiastic junior class, but that a majority of the present members of the course will be enrolled in the senior class. All who expect to enroll in either class should notify the publishers of their intention at an early date in order that proper preparation can be made in time and delay avoided in sending out recitation blanks when the course opens.

A new and complete prospectus is now in preparation and will be sent to all who apply for it.

LEAKS AND HOW TO PREVENT THEM.*

By EDMUND J. WEIR.

In this era of ruinous cut-rates and commercial rivalry, it behooves the retail druggist, sandwiched, as he is, between the department store man on the one hand and the dispensing physician on the other, and in the throes of a cut-rate war, to keep his wits about him if he wishes to make both ends meet. Many of the lines which druggists once considered peculiarly their own are fast slipping from them, while the profit has been reduced to a minimum on the remaining few; and it is patent that if the drug business be not reconstructed on a different basis, the problem of existence for the retail druggist will become a serious one.

The Department Stores.—The chief cause of the depression in the retail drug trade and corresponding diminution in the profits is the pernicious influence of the department stores. The handling of patent medicines and domestic remedies by these stores is fast sapping the vitality of the drug trade. Many of these places have in connection with their businesses fully equipped pharmacists, which they run as a side line to attract trade. The selling of drugs by these concerns should be stopped. By it the regular pharmacist, who has spent both time and money in fitting himself to intelligently serve the public, is being deprived of his livelihood. No druggist can afford to attempt to compete with these stores, for by doing so he is degrading both himself and his profession.

The rapid spread of this indicates that unless a system of quarantine be speedily enforced and disinfection vigorously proceeded with, the disease will soon become epidemic. The situation is not entirely hopeless, however. Although one can hardly expect the general public to evince much sympathy for the druggist in this much needed crusade, and although it is needless to look to the Government for special legislation, yet, if the druggists will but stand together, there is little doubt that, with the aid of the manufacturers and wholesalers, the trade can be controlled and the old healthy condition of things restored. If the manufacturers agree to restrict their sales to the wholesale trade, and the latter consent to dispose of their goods only to legitimate retail druggists, who in turn bind themselves to purchase only from the wholesalers, and these agree to the conditions named and sell at specified and reasonable figures, the general stores can be prevented, not only from cutting prices—also from selling drugs—of any description.

Physicians' Dispensing.—In regard to the physician doing his own dispensing, there is much to be said on both sides. Pharmacists who take it upon themselves to severely censure the dispensing physician, should not forget that there is a great deal of truth in his contention that he has been forced into dispensing in order to protect himself. The pharmacist cannot expect the support and patronage of the physician if, while pretending to cater to him, he makes every effort to antagonize him. The countenancing of quackery by recommending patent medicines, the refilling of prescriptions without orders

from the physician, and the practice of indiscriminate counter prescribing will ever be opposed by honorable physicians. Other causes of friction are the unwillingness of the druggist to break stock packages, and his refusal to allow a discount to the physician on the latter's supplies. Every doctor requires a greater or lesser supply of drugs for use in his practice. To supply this want, physicians' supply houses have sprung up like mushrooms all over the country; and these get the bulk of the physician's trade. There is not one doctor in a hundred but would prefer to buy his drugs in small quantities as he requires them from the local druggist, if he could do so at reasonable prices. If the druggist would only break stock packages for the physician and allow him a reasonable discount, the competition of physicians' supply houses would soon cease. The result of this buying in large quantities is that the physician, having a supply of drugs greatly in excess of that required for ordinary use in his practice, uses up the surplus in dispensing for his patients. The habit of many doctors to give compressed tablets to their patients with directions for their use, instead of writing prescriptions to be filled at drug stores, is another result of this inter-professional rivalry. The practice is, however, said to be on the wane.

Counter Prescribing.—If the pharmacist wishes to establish congenial relations with the physician, let him respect the rights of the physician by refusing to refill any prescription unless authorized by the latter, and let him refuse to advise persons coming to him for medical advice, suggesting that they apply to one of his doctor patrons. Then, when he has eliminated from his business these things which are directly opposed to the rights and interests of the medical profession, the physician will again give him the merited support.

The Patent Medicine Traffic.—It is an undeniable fact that the "patent medicines" are largely responsible for the shrinkage in profits that the druggists are all bewailing. The traffic in these has assumed alarming proportions in certain quarters. Money and printers' ink are lavishly used in some instances to portray, in glowing colors, the supposed merits of the preparation; doctors and clergymen endorse them; while the unsuspecting and ever credulous public are inclined to accept the statements in toto, as fact. It is true that many of the so-called "patent medicines" are excellent preparations, but these are in the minority as compared with the vast number of nostrums which, although widely advertised as panaceas, are in reality absolutely worthless as remedies. These nostrums often claim to be specifics and valuable new discoveries, when they are but simple remedies, possessing no originality of formula or improvement in compounding. The consumption of these medicines affects both the physician and the pharmacist. The habit of self-medication induced by it has greatly diminished the doctor's practice; consequently the druggist, whose income depends chiefly on his prescription trade, incurs losses from the falling off in dispensing, which the small profits derived from the

*Major portion of a paper originally published in Merck's Report.

sale of the patents cannot reimburse. Even if sold at full prices, they are by no means a source of profit. The number of preparations made by different firms, but almost identical in composition, which must be kept in stock to satisfy the demands of customers, and the length of time that some of these preparations remain unsold upon the shelves, preclude the enjoyment of large profits from this source. Besides this, they deprive the pharmacist of his right to compound simple remedies for simple ills, and sell them at a reasonable price; and many customers consider their sale by druggists in itself a recommendation.

The retail druggists should, therefore, make a concerted effort to cut themselves loose from the nostrum trade. If the various pharmaceutical associations would have the quack remedies analyzed and the results published in a parallel column in the papers, where their vaunted excellence is extolled, the eyes of the public would be opened as they never have been before, and their confidence in quack remedies shaken. No pharmacist need fear the consequence of having banished them from his store, as few persons will buy from the grocer medicines discarded as worthless by the druggist.

Insects in Drugs.—The losses in the drug store, with the exception of those which have been previously dealt with, and for which druggists are responsible more as a class than as individuals, are due entirely to mismanagement. Unless great care is taken in the selection of drugs and in their preservation, they rapidly deteriorate and become in a short time practically valueless. Roots, barks and leaves, powdered drugs, such as jalap, ginger, rhubarb and capsicum, and liquid preparations of organic drugs, are most liable to deteriorate; the former two through the ravages of insects, the latter through chemical change. The pests attacking crude organic drugs belong to many orders of insects. The majority of these confine their attentions to a few particular drugs, but there are some which have a "sweet tooth" for almost everything in the organic drug line. These are the true pests of the drug store, and consist of the *Sitotropha panicea*, the *Lathridius filiformis* and the larvae of the *Tinea Zeae* and *Pyralis farinalis*.

Of these the *Sitotropha panicea* is perhaps the most abundant. It belongs to the family *Ptinidae*, and is closely related to the *Anobium paniceum*, or death watch, an insect which affects decaying wood. This family consists of a number of small, brown beetles, easily recognized by the hood-like prothorax which projects over the head to such an extent that it almost covers it. The *Sitotropha panicea* is among the most important of this family. It is from two to three millimeters in length, with its brown subcylindrical body almost covered by fine, short, yellow hairs, arranged in parallel longitudinal lines, which present a finely striated appearance on the wing covers. The larva is a small, white grub, with strong, dark jaws and three pairs of legs. When at rest it usually assumes a semi-circular position. The metamorphosis from grub to beetle takes place with great rapidity, and the cycle of its life is soon completed. This insect, both in the larval and adult stages, feeds on dead, dry, vegetable and animal matter, which it devours by means of its strong, sharp jaws. It feeds voraciously on drugs, and has been found regaling itself on aspidium, calumba, corlander, aconitum, mustard, belladonna, poke-root, angelica, ginseng, tritium, ipecacuanha, etc. It is almost omnivorous, and is destructive to almost every kind of vegetable product.

The *Tinea Zeae* is a member of the family *Tineidae*, a family of small moths, the moths mentioned in the Scriptures and the moths of the household. Although the smallest of the lepidoptera, and therefore called micro-lepidoptera, the moths of this family are among the most beautiful and the most destructive. They include the clothes moth (*Tinea vestimentalis*), the carpet moth (*Tinea tapetzella*), and the fur moth (*Tinea pellionella*). The body is long and slender, the tongue is very small, the wings are entire, often narrow, and mostly convoluted in repose. Many of them are very brilliantly colored, exhibiting beautiful little stripes and patches of gold and silver. The *Tinea Zeae* is not one of the showy ones. It is small and inconspicuous, especially when at rest, when it carries its whitish wings pressed closely to its sides. It is very prolific, and the female dies after it has de-

posited its eggs. The larva, which is small and white, weaves a case for itself out of the substance on which it is feeding. This grub is not very particular as to what it eats; it is almost omnivorous, as far as drugs go. It thrives equally well on aconite root and taraxacum. Rhubarb, either in root or powder, is a favorite diet. It devours ergot, burdock, curry powder, and capsicum with avidity, but from some reason known only to itself it will not touch gentian, gelsemium, senega, sanguinaria, or sarsaparilla.

The *Pyralis farinalis* belongs to the family *pyralides*, or delta moths, so-called from the delta shaped form of the closed wing. The body is long and thin, the forewings rather narrow and elongated, the legs are slender, and the antennae are long and generally simple. The larva of this insect attacks many drugs, especially farinaceous ones, such as flaxseed, liquorice, senna, acacia, etc.

The *Lathridius filiformis* is a small, black beetle, with a long thread-like body and slender legs. It has been found in absinthium, aspidium, belladonna leaves and root, ergot, lemon peel, elm bark, ginger, etc.

To preserve drugs from insects it is indispensable requisite that they be kept in air-tight containers. Even this can, from the very nature of things, be only partially successful, as the eggs, which subsequently produce the grubs or larvae, are frequently deposited in the material before it is stored. In fighting insects infesting drug tissues, it goes without saying that the means usually employed by entomologists—solution of arsenite of copper, corrosive sublimate, etc., and the household expedients such as turpentine, benzine, coal-tar, tar-paper, camphor, tobacco, etc.—are out of the question. It is possible, however, to use a treatment which is practicable, a treatment which will in no wise injure the drug, but which will destroy any insect life; namely, that with the vapor of carbon disulphide. The mode of treatment usually recommended is as follows: Pour a little of the liquid on a small piece of sponge, and place the latter in a shallow tin box or other suitable vessel. Inclose this in an air-tight box with the infested drug previously separated from all dust and debris caused by the insects. The vapor of the carbon disulphide, in consequence of its density, falls on the entire mass and diffuses itself through the organisms encountered by it, carrying death to any insects the vessel may contain. Chloroform, used in a similar manner, is also recommended for this purpose, but carbon disulphide has been found to be as effective as chloroform and much cheaper.

Unstable Galenicals.—The classes of galenical preparations which, being easily affected by changes of temperature and the action of the air and its micro-organisms, are most liable to deteriorate through the lack of a little care, are fluid-extracts, syrups, and distilled waters.

There is in the drug store no class of preparations requiring such constant attention as fluid extracts. So productive of trouble are they, if made of the proper strength, that the manufacturers frequently find it necessary to store them for some months before sending them out, on account of the precipitation which sets in shortly after they are made, and continues for some time. On its cessation, by siphoning off the clear liquid, presentable and permanent preparations are obtained; but frequently even these precautions do not prevent the formation of unsightly sediments. As fluid extracts are concentrated solutions of organic principles, they are easily affected by changes of temperature and by the action of the oxygen of the air. In both cases sediments are formed, which, though sometimes of little therapeutic value, always carry down some of the active principles, and thereby diminish the strength of the extract. An increase of temperature causes evaporation of the alcohol, thus precipitating the ingredients held in solution by it; while exposure to the air results in oxidation and the consequent formation of insoluble compounds. Fluid extracts should, therefore, be made or purchased only in small quantities, and should be kept in small bottles and protected from extremes of temperature and from the air. Another source of trouble is the gelatinization of fluid extracts, especially those containing astringent principles, such as cotton root, kino, cranesbill, catechu, etc. Although in most cases the change cannot be prevented, the addition of a little glycerin will often retard its progress. With fluid extracts of senega the addition of an alkali will

prevent gelatinization, or, if this have already set in, it will restore the drug to its original condition.

As regards syrups, the chief source of their deterioration is lack of protection against excessive temperatures. The most noticeable result of this want of care is crystallization through an excess of sugar, and fermentation, because of an insufficiency of it. If syrups are not carefully stored in a moderately warm room during the winter, separation of the sugar will take place, and crystals will form at the bottom of the container. On the other hand, if kept in close vicinity to stoves and radiators, the water evaporates from the surface of the liquid, condenses in the upper part of the receptacle, and, falling on the syrup, dilutes the surface portion to such an extent that fermentation sets in in a very short time. Some chemical syrups are very liable to become bad, if kept in even a moderately warm place, on account of the acids which they contain. In Parrish's chemical food the phosphoric acid acts upon the cane-sugar, forming glucose, which is very much inferior to cane-sugar, both in solubility and in sweetness, with the result that, not only is there an unsightly mass of crystals at the bottom, but fermentation takes place, leaving the syrup practically useless. Syrup of wild cherry bark will rapidly deteriorate, through the volatilization of the hydrocyanic acid it contains; and syrup of tolu, through the decomposition of its cinnamic acid. Syrups should be made of such a saccharine strength that they will not crystallize at a temperature of 60° F., and they should be kept at that temperature and tightly corked.

Distilled waters form a very troublesome class of preparations to keep as well as to make. Unless preserved in loosely-stoppered bottles, so as to admit of aeration, various forms of canker will form in them. Deterioration may be best prevented by closing the bottles with absorbent cotton, or by using a cork through which passes a glass tube which, when plugged loosely with absorbent cotton, admits filtered air in sufficient quantity to keep the water in good condition.

Other drugs requiring care are gum resins; very hygroscopic drugs, such as zinc iodide, sodium nitrate, iron bromide, etc., which are best preserved in closed vessels, over burnt lime, in a so-called "cold drying closet;" and narcotic extracts, volatile oils, saccharated ferrous iodide, mercuric oxide, and other substances easily decomposed, which should be kept in air-tight containers and in a dark, cool place.

Side-Lines.—There are a few side-lines which are well adapted to the drug store and which no druggist can afford to be without. These are generally termed "druggists' sundries," and include combs and brushes, soaps, perfumery, medicated and perfumed lozenges, syringes, atomizers, manicure sets, and numerous other articles necessary for the toilet and in the sick-room. These articles need be carried only in small quantities. They command good prices, require little attention, and are essential adjuncts of every drug store.

A combination for which there is a great demand but with which the druggist, as a rule, does not seem to have much success, is that of soda-water and cigars. Many druggists say that after trying for a season of two to build up a trade in soda water, they have had to give it up, because it did not pay. If the druggist cannot make this thing pay, how can others? Yet there is no complaint from the confectioner and the department-store man, even though he sell soda water at two glasses for five cents. Judging from the apparent success of these parties, it would seem that soda water, even if sold at cut rates, is a paying investment. Yet it is asserted that to 95 per cent. of the soda-dispensing druggists of the large cities, the fountain is both a nuisance and an expense. It is evident, therefore, that there must be something radically wrong with the modus operandi of the druggist, or that his competitors have natural facilities for successfully carrying on this business which he does not possess and which give them great advantage over him. To some extent both of these are true. The large confectionery and department stores have facilities which the druggist, with his limited space and crowded stock, does not and cannot expect to possess. These advantages, which greater store-room confers, however, cannot be accountable altogether for the success of the one and the non-success of the other. It is frequently the poor quality of

the druggists' soda, and the slovenly manner in which often it is served that have diverted this trade from the drug store to the places where its requirements receive more attention. How many druggists there are who try to run the fountain on the cheap scale, who stint on ice and accordingly serve their soda water half cold, who flavor their syrups with acetic and butyric ethers and extract oforris root, in place of the more expensive, but much superior, flavors which nature furnishes, who serve soda water in thick, heavy glasses because they cost less than thin ones, and who have no regard for aesthetic effects in making this line attractive!

In order to make soda water a paying investment, it is necessary to acceptably please the critical taste of the public. To do this the soda water supplied must possess certain qualities. It must be good, it must be cold, and it must be clean. Good soda water is the "sine qua non;" if the soda be good it will possess the other properties. The carbonated water used must be of the best quality, the syrup must be fresh and delicately flavored, the water must be thoroughly mixed, and the whole must be neatly served.

In making syrups, confectioners' sugar should be used, if possible, as the ultramarine coloring common in granulated sugar is liable to cause the syrup to ferment. Ten pounds of sugar to a gallon of water is generally sufficient; more than this quantity will produce too dense a syrup to mix readily with the water. Saccharin is rapidly becoming popular as a sweetener for soda syrups. The following directions are given for using the refined saccharin on the market: Heat in an earthenware or enameled vessel one gallon of water to a boil; after removing from the fire stir in one ounce of saccharin until dissolved. Then add this to thirty-two pounds of sugar previously dissolved in seven gallons of water, either hot or cold. This produces 104 gallons of syrup, costing about 27 cents a gallon. As one ounce of saccharin takes the place of thirty-two pounds of sugar, it will greatly reduce the price of soda syrups. Sugar must, however, be used as a body, for saccharin gives no body to its solutions.

For the flavoring, nothing but natural fruit-juices should be used. Although they are more expensive and more troublesome to keep than the fruit ethers, they well repay any extra expense and trouble by their fineness of flavor and their merited popularity; and no druggist who wishes to make his soda water trade a paying one, can afford to use any substitutes.

The soda fountain and its accessories can never be too clean. The serving slab should be washed with warm water several times a day. The glasses should be well rinsed in the tumbler-washer, and if cream has been served in them, should be previously washed by hand. The attendant should be as clean as the apparatus; a clean apparatus and a slovenly attendant cannot very well go together. If the druggist runs his soda fountain on practical lines he should have little difficulty in making it pay. The advent of the bicycle has created a great demand for "soft" drinks, and the druggist, especially if his store is on a good cycling thoroughfare, should corral the bulk of this trade.

Nearly every druggist, particularly in small towns, handles cigars. It is hard to tell why. They by no means increase the attractiveness of his store, nor do they add anything to his profits. If neither the druggist nor his assistants smoke, and if all his friends and medical patrons insist on paying for the cigars they consume, it is possible that he may make a little money from this source; but the probabilities of making his cigar trade a paying one, under ordinary conditions, are very meager.

Neglected Advertising.—An advertising medium much neglected by the druggist is the show-window of his store. Look into the show-windows of an ordinary drug store, and what do you see? The traditional show-globes with their colored liquids, a few goods jumbled indiscriminately together without any attempt at artistic arrangement, some boxes of sea-salt, perhaps, as a back-ground, and the whole set off by a few pictures of scantily dressed females designed to illustrate the advantages of using a particular quack nostrum internally or a certain kind of soap or powder on the outside, and perhaps a card or two telling of some entertainment long since past or some church affair with a 10 or 25 cent admission fee! In

dressing the window the druggist should keep in mind the object in view, and be guided accordingly. It is to display in an attractive manner a fair sample of the goods to be found within. The goods displayed should be of such a character as will appeal with force to the purchaser at the time being. In other words, the druggist's window should be dressed with his newest and most seasonable goods. Any special bargains should be placed as nearly as possible on a level with the eyes of passers-by. Price tickets should be of a color to suit the goods, prices should be plainly marked, and every legitimate method of attracting the attention of the public should be used. A well-dressed window cannot be surpassed as a means of attracting trade. It is the sign of cleanliness, taste, thrift, and business enterprise. It is the merchant's cheapest advertisement. It catches a class of trade which is well worth the baiting, and which could not be attracted were it not for the show. It indicates neatness on the inside, instils in the public a confidence in the carefulness and ability of the proprietor, and pays twice over for any expense necessary to make the display effective.

In conclusion it might not be out of place to give the following unique set of "Rules for Drug Clerks," which appeared some time ago in a Canadian pharmaceutical journal.

1.—If you see a customer enter, turn your back and look at some bottles on the shelf. It has an air of sociability.

2.—Always have the floor of your store mopped up in the busy time of the day. It impresses the customer with the idea that you value cleanliness. The same rule would also apply to your windows.

3.—If a lady asks for a postage-stamp, exclaim, "Don't you see that I am busy?" If the directory is wanted, shout, "Couldn't you see it when you came in?" Perhaps she doesn't feel humble enough already at asking the favor of you, and these little pleasantries will put her in the proper mood.

4.—Always wear an angry expression when you have to go over to the soda fountain. It is not suitable work for a man of your ability, and you are not paid to conceal your feelings.

5.—Distribute two or three cats over the store. It makes fun when a customer brings in a dog.

6.—If a lady asks about perfumes, take an atomizer and spray some in her eyes. When she sees how lavish you are with it, she will appreciate its value.

7.—Never put up a prescription in less than half an hour after you receive it. You are the best judge of its urgency.

8.—Never change the contents of your show-cases. Customers who have been coming in for several years might miss sight of old friends.

9.—If you are selling tooth-brushes, always rub them across your hands or sleeve to show how pliable the bristles are. It enhances the value to the buyer.

Carry out these rules for six months, then apply for an increase of salary.

GOLD EXTRACTION WITH POTASSIUM PERMANGANATE.—A new process for the extraction of gold has been tried with success in the gold districts of New Zealand. The finely powdered auriferous ore is first mixed with common salt and sulphuric acid, and potassium permanganate is then added in solution. Hydrochloric acid is formed by the action of the sulphuric acid on the salt, and from this chlorine is liberated by the permanganate. The chlorine then combines in the nascent state with the gold, forming soluble gold chloride. The new method is said to have many advantages over the cyanide and amalgamation processes. The chemicals used are harmless, non-poisonous and cheap, and the extraction of gold from the ore is nearly complete. A particular advantage lies in the fact that the process can be applied to ores containing copper, for which the cyanide process cannot be used. A gold mine at Mount Morgan, New Queensland, obtained by the permanganate process 95 per cent. of the gold present from ore yielding only 25 per cent. by the cyanide process. The ore contained also copper, iron, antimony and manganese. (Südd. Ap. Ztg.).

PHARMACY ON A BRITISH TROOPSHIP.*

BY EITTOLO.

The pharmaceutical arrangements on board one of Her Majesty's troopships are necessarily more or less elaborate and extensive, but I do not think any detailed account of them has ever appeared in any pharmaceutical journal.

The present writer has an exceptional opportunity for supplying accurate information, as he is actually writing this communication on board one of these ships. The old-fashioned troopship has for the last few years entirely ceased to exist, as the ships originally built for this purpose gradually became obsolete, and were not replaced by others. Troops are now conveyed on ships belonging to either the Peninsular and Oriental or British India steamship companies. They are chartered for a certain number of voyages, and come for the time being under the entire control of the Admiralty, for it is this department, and not the War Office, which is responsible for the transport of troops from one part of the world to another.

A room is fitted up in the ship as a pharmacy. It is a fair-sized compartment—as things go on board ship—measuring 15 feet by 12 by 10, and is fitted with properly labelled and stoppered bottles containing all the principal drugs. Each bottle is secured from rolling about by means of a double shelf forming a socket, in which it is firmly held. There is a good-sized dispensing counter measuring 6 feet by 4. An ordinary pharmaceutical balance with glass scale pan is fixed in a sliding attachment. A sink is provided, but water is not laid on. There is a liberal supply of measure-glasses, pestles and mortars and bottles. A pill machine, ointment slab, and spatula are also provided.

Poisons are kept in a locked cupboard, the key of which is kept by the Sergeant-Compounder. A regular staff of medical officers is provided, and the senior is detailed as "Medical Officer in Charge of the Ship." He is directly responsible for the health of all troops on board and all medical stores and apparatus. The pharmaceutical department is deputed to a Sergeant-Compounder of the Medical Staff Corps, who is assisted by a corporal and the privates of the corps.

There is a regular hospital on board, with beds for 36 patients. On the outward voyage this is not much occupied, but on the homeward trip provision has frequently to be made for quadruple this number. A strict system of prescription writing is observed, and all prescriptions are written direct into books kept for the purpose.

The military pharmacist has no assistant who is qualified to relieve him, and, in consequence, is practically always on duty; but, as a matter of fact, his work does not occupy more than four hours a day. The sick are seen at 10 o'clock daily, and all prescription books reach the pharmacy about 11 o'clock daily, so that the dispenser can generally complete his duties before one o'clock. The rate of pay of the dispenser on board a troopship is very good.

He receives 2s. 8d. a day regimental pay, 1s. a day corps pay, and 1s. a day extra duty pay, making 4s. 8d. in all, or 32s. 8d. a week. He is fully fed, and has comfortable quarters, so that the military pharmacist on a troopship has an excellent opportunity for saving money.

The corporal, who is, of course, a much younger soldier, receives 2s. 1d. a day regimental pay, 8d. a day corps pay, and 4d. a day extra duty pay, making 3s. 1d. a day, or 41s. 7d. a week.

The orderlies receive no extra pay, which seems somewhat unfair, as their duties as nurses on the homeward voyage are often very onerous. Their pay is only 1s. 2d. a day regimental pay, and 8d. a day corps pay.

CRUDE CHICLE GUM from *Achras Sapota*, used for the preparation of "chewing gum" and as a cementing material, contains 75 per cent. of resin, 10 per cent. of gum, 9 per cent. of calcium oxalate with 5 per cent. of sugar and inorganic salts. When purified it is plastic, can be vulcanized, and it is similar in general properties to gutta percha.

* Reprinted from British and Colonial Druggist.

(Special Correspondence.)

NEWS FROM GREAT BRITAIN.

London, June 15.

Since war began between the States and Spain there has been no great rise in products from either country, and although a few things have altered, yet the amount has been inconsiderable to what was expected. Wheat and bread ran up, but now the slump has set in that can be credited to speculation rather than the war, and pharmacy and the drug trade in England have not suffered or benefited materially.

The New B. P.

has been the cause of much mild excitement since its publication, but when once the wholesalers had finished the scramble for first place in having everything ready, the interest began to tame down.

Speaking from the standpoint of manufacturers there seems to have been no simplification of methods of production, and now that more preparations are standardized more skilled work will be necessary; the alterations in alcoholic strength are in many cases too trifling to alter the price of tinctures, but the manufacturer will have to bear the cost of the added 2 or 3 per cent. of proof spirit; the standards of purity and the tests enumerated for several products are decidedly stringent.

The test for

Lead in Citric and Tartaric Acids

is erroneous and makers are put to a deal of trouble thereby. The compilers of the B. P. have not taken into account work by men of eminence on the subject, or if they have they have subsequently fallen into error. The trade test for the acids requires that their solutions shall give no coloration when mixed with a saturated solution of hydrogen sulphide, but the Pharmacopoeia now requires the acids to be neutralized with ammonia before adding the hydrogen sulphide, and here is the trouble, for iron gives a coloration which the B. P. test attributes to lead, and it is practically impossible to make either acid absolutely free from iron.

A certain amount of difficulty has been caused by want of uniformity in adopting the new B. P. at, or from, any particular date. The general impression is that it becomes legal directly its publication is notified in the London Gazette by the General Medical Council, but some prominent establishments have decided not to begin using B. P. '98 preparations until midsummer, whereas others have been employing them as soon as they could clear their old stock.

Chemists and the New B. P.

Some dissatisfaction has been expressed with the part which pharmacists take in connection with the publication of our national medicine book, for it is only by favor of the General Medical Council that they are even asked to express an opinion on the pharmacy of the pharmacopoeia and their suggestions are even then not always accepted. There is no doubt that pharmacy, prescribing, and chemistry are subjects in which doctors take a lessening interest, for in these days of specialties they find it so much easier to order X. Y. & Co.'s Syrup, Pills, Tablets or what not, than to think out a sensible prescription. This development in prescribing can be exemplified by any pharmacist, for they have only too good cause to regret having to buy pound bottles of X. Y. & Co.'s Liqueur, Q. In order to supply one ounce in a prescription, and then keep the other 15 ounces themselves. Chemists therefore feel that they are entitled to a more prominent part in the compilation and they hope that some change will be made in that direction.

After many ups and downs the

Pharmacy Bill.

has passed the third reading in the House of Commons and will, it is expected, be passed by the House of Lords without further discussion. Members of the House who have opposed the bill have done so to endeavor, so they say, to get changes made in the law relating to the sale of poisons, and to prevent chemists getting a monopoly for selling arsenical sheep dips and weed killers. It seems, however, that the Government have ideas of their own about a new Poisons Act, and, as the Pharmacy Bill had to do with the internal affairs of the Pharmaceutical Society it was outside the question of the bill. So now

in a short time every person who qualifies as a chemist and druggist will be able to become a member of the Pharmaceutical Society, which was a privilege granted to major men only hitherto. During the debate a member gained the point from the Government that they would consider the question of major men being granted a distinctive title, but what that will be, or what its value, is quite doubtful yet.

Next to the late Mr. Gladstone among the list of distinguished men who have departed this life during the past month occurs the name of Lord Playfair. This savant commenced his study of chemistry under Graham at St. Andrew's University, and continued under Liebig, but his experience was a varied one and fitted him for the chair of chemistry, to which he was elected at the Manchester Royal Institution in 1843. From that he gradually became associated with numerous Government appointments and ultimately he gave up all his appointments to follow politics. He was a member of several Governments, occupying the post of Postmaster General among other important offices. He was one of the founders of the Chemical Society and on June 9 of this year he, with six other aged savants who had filled the presidential chair of the Chemical Society, were to have been entertained at a dinner of the Fellows. He was an honorary member of the Pharmaceutical Society for many years and always took an interest in pharmaceutical politics.

Pharmaceutical Politics

met with a very poor discussion at the annual general meeting of the Pharmaceutical Society and the elections to the Council created very little interest. At the first meeting of the new Council Mr. Walter Hills was again elected President for the third time.

In scientific circles there has been a deal of healthy rivalry between Professors Dewar and Ramsay, and two very important discoveries have been recorded by them recently. Prof. Dewar is the gentleman who talks unconcernedly about temperatures of 200° , and shows liquid air in open vessels, who freezes mercury and liquefies everything gaseous. On May 19 he communicated to the Chemical Society the fact that he had

Liquefied Hydrogen and Helium

by cooling them to -265° and passing them through a fine jet into a vacuum vessel under a pressure of 180 atmospheres. The professor is sceptical about anyone having done this previously and says that now every gas has been liquefied, but he did not then count on Professor Ramsay finding him a new gas to liquefy within a day or two and publishing his discovery within a few days of his own statement that every known gas has been liquefied.

Krypton

is Professor Ramsay's new element, and he says it exists in the atmosphere in the proportion of 1 in 10,000, but although he has isolated it and exhibited it, or rather its spectrum, yet he thinks there is much more to learn about it yet.

The Annual Chemists' Exhibition is being held this week at the Agricultural Hall. The exhibitors are more numerous than last year, but yet it is still chiefly a Sundries Trade Exhibition. Several drug firms are exhibiting and have a fine show of pharmaceutical products. Of American firms Messrs. Armour & Co. of Chicago have a large exhibit of all their products, but particularly those of interest to chemists and doctors, and evidently know how to do business at an exhibition. Messrs. Parke, Davis & Co. have also a large display and several things American. The Exhibition is pioneered by the British & Colonial Druggist, and bids fair to beat the records of previous years. One noticeable feature about it is the increase of firms who take up advertisement and show card printing, and it seems that English druggists are taking the lead of the States in cute advertising.

Of social functions there have been many recently, but of them all the Pharmaceutical Society's dinner and a Tri-Presidential Reception by the heads of the Society of Chemical Industry, Society of Public Analysts and the Institute of Chemistry, brought numerous chemists and folks who are directly interested in chemistry and pharmacy together. Next month the Society of Chemical Industry holds its annual meeting at Nottingham, but I have not yet heard who will attend to represent the New

York Section. The British Pharmaceutical Conference meets in Ireland, at Belfast, the month after.

The prospects for green medicinal plants are spoken of favorably so far and the crops will soon be ready for cutting; *Belladonna* is generally ready first, but it wants some more warm weather to bring it to perfection.

Alkali

And the attendant industries have not improved this year and now there is a big labor dispute in South Wales, which has kept the collieries idle for many weeks, so that trade in that district has suffered. Mineral water manufacturers are complaining of the coldness of the weather and the lateness of the season, for their goods are not yet in good demand.

POWER FROM LIQUID AIR.

The proposition that liquid air should be used for power storage has already been noted in these pages. Calculation shows easily enough that great power may be obtained from a very small quantity of the substance, but the trouble is in controlling it. No known closed vessel is strong enough to hold it at ordinary temperatures, and to maintain it below its boiling point would require an expenditure of energy that would be more economically used in directly producing the required power. For the storage of power for any length of time—for instance, in the running of a steamship across the ocean—the substance does not seem yet to be available; but where it can be conveyed in open vessels and kept boiling it may apparently be used, though not with much profit. The question is discussed fully by Frank Richards in the *American Machinist* (Literary Digest) as follows:

"As to the power to be obtained from the air if allowed to re-expand under suitable pressure, it seems necessary to say something as to the conditions under which alone it would be possible to so employ it. At Mr. Tripler's laboratory, or wherever the liquid air has been exhibited, one condition always carefully observed, is never to confine it. The liquid air, or aerine, is always conveyed in open vessels. The sides and bottom of the receptacle are surrounded by masses of felt, or other heat-insulating material, and such material is also usually laid over the top, but always loosely, or with sure provision for the escape of the air which is constantly boiling away. It is, therefore, apparently impossible to convey the liquid by any conceivable system of piping. It must, so far as now appears, always be conveyed from place to place in open vessels, and it must always be boiling away, although the loss may be kept surprisingly low.

"The phenomenon of the boiling of the air is so closely similar to the boiling of water that it is quite possible to conceive of the liquid air being pumped into a carefully insulated boiler with an ample and always operative safety valve, just as the feed water is pumped into a steam boiler. Here it could re-evaporate just as the water is converted into steam, and then be led to a suitable engine. No fire, of course, would be necessary for the re-evaporation. The simple removal of part of the insulation would insure a sufficient communication of heat. There would always be danger of too rapid communication of heat and consequent uncontrollable increase of pressure. One experiment shown in connection with the liquid air is the blowing out of a plug from a tube in which a little of the air is confined. A tube, say, 1½ inches in diameter and a foot long, with the lower end closed, is held vertically, and a tablespoonful or so of the air poured in, and a wooden plug driven into the top of the tube. It requires very lively work to drive that plug in before it is driven out, with great force by the expanded air, no heat being applied except that contained in the walls of the tube."

Mr. Richards calculates that if we suppose air to be compressed by an exertion of 73 horse-power, then liquefied by Mr. Tripler's process, and then allowed to boil away as suggested above, using the product to drive an engine, we should get from its expansion a little less than one-half of one horse-power, or about two-thirds of one per cent. of the initial power employed. Under these circumstances he thinks, very properly, that "we are not likely to see liquid air extensively and practically employed for power transmission." In other words, liquid air seems promising only as a means of storing power in very small compass, but as yet no means of withstanding its enormous pressure in confinement has yet been found. Nor does Mr. Richards think that the liquid air will do much better as a refrigerator. The 73-horse-power would make in an hour 2,044 pounds of ice. Says Mr. Richards: "Instead of that, ice, we have about 1 per cent. of that weight of an extremely cold liquid, very inconvenient to handle, convey or preserve. Any sane person would be likely to bet on the ice every time. We are not more likely to use liquid air in our refrigerators than

in our motors. I have profound respect for liquid air, and I am as interested as any one in the novel phenomena which it discloses. It is rich in promise as an aid to the scientific investigator, but I cannot yet see that it has much to offer to the man who insists upon results of immediate practical utility."

KRYPTON AND NEON.

The recent discovery in the atmosphere by Professor Ramsay and Mr. Travers of two gases whose existence had not been suspected will excite scarcely less interest than the finding of argon four years ago by Professor Ramsay and Lord Rayleigh. The announcement recalls the lecture which the former gentleman delivered last summer before the chemical section of the British Association for the Advancement of Science. His talk on that occasion was devoted to "An Undiscovered Gas," which Prof. Ramsay and Mr. Travers had already been hunting for, but without success.

It was pointed out that, in accordance with the strange custom which leads the elements to arrange themselves in such groups that their atomic weights bear a mathematical relation to each other, a gap was left in the series to which helium and argon belonged. In many other groups that were specified the difference in the atomic weights of the first and third members was 36, and between the first and second 20. The interval between helium (4) and argon (40) was such as to satisfy the now eminent English chemist that a gas would yet be found whose qualities resembled those of the two just mentioned, and whose atomic weight would be 20. From what is known in regard to krypton, which is the first of the newer discoveries, it does not appear to fit into the vacant place. If, as Professor Ramsay thinks, it belongs in the same series as helium and argon, it must follow them both. Its atomic weight has been provisionally estimated at 80. The other gas, neon, is said to be much lighter, but until further details are supplied it will be impossible to say how far it conforms to Mendeleef's periodic law, and to determine which particular note it sounds in the marvellous rhythm of nature.

The genuineness of these discoveries is not open to question. The methods pursued in treating the liquid air from which krypton and neon were obtained leave no room for doubt on that point. First the oxygen was abstracted, and then the nitrogen. A residue was left which had other qualities than those of argon. It gave a different spectrum, for instance. Besides, when a sample of the new gas was sent to that high French authority, M. Berthelot, the fact that a hitherto unknown element had been found was fully established. In regard to neon, corroborative evidence is yet lacking, but this would seem to be only a question of time.

Like nitrogen, argon was found to be an exceedingly inert gas. It showed the utmost indisposition to form chemical compounds. If it should prove that krypton and neon evince the same traits of character, their discovery may possess less practical value than otherwise. But it would not be safe to jump at conclusions in this matter. For a long time the finding of those rare metals lanthanum, cerium, thorium and didymium was merely a subject of academic interest. Years elapsed before Dr. Auer von Welsbach utilized them in his incandescent gas burner. It is too soon to declare that krypton and neon will never render service to industrial art.

PURIFICATION OF DRINKING WATER.—A rapid and practical sterilization of potable water consists, according to Lapavère, in treatment with a mixture of equal parts of dry aluminum sulphate and calcium hydrate with 10 per cent. of potassium permanganate. Of this 15 to 20 grains per gallon are required for water and 60 grains for sterilizing sewer-liquids. If the quantity added is sufficient, the red color of the water should remain after a contact of 15 minutes. The water is then filtered through a funnel partially filled with wool which is impregnated with manganic oxide (Mn_2O_3), through which it passes clear and colorless. When the wool becomes so much covered with manganese dioxide as to impede filtration, it is sufficient to boil it with water containing 0.5 per cent. of hydrochloric acid, to render it again fit for use. Practical experiments with various bacteria have proved the efficiency of the method. (*Zetsch. Ang. Chem.*).

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Queries from Non-Subscribers not Answered.

D. L. Davis, Bloomfield, Iowa, and C. Bukens, Philadelphia, Pa., will please read the rules at the top of this column, and they will understand why their queries are not answered.

Burglar Alarm.

(P. A. D.) Address the Holmes Burglar Alarm Telegraph Company, No. 26 Cortlandt street, this city.

Lee's Lithontriplic.

(G. J. E.) Lee's "Lithontriplic" may be obtained through the Charles N. Crittenton Company, of this city, who are the sole agents. The jobbing price is \$30 per dozen.

Syrupus Roborans.

(A. R. G.) Syrupus roborans is stated by the manufacturer to be a "syrup hypophosphites comp. with quinine, strychnine and manganese (1-125 grain strychnine to the teaspoonful)". We cannot give the formula.

Soda Water Foam Producers.

(C. W.) Formulas for preparations of this character were printed in the issues of this journal July 22, 1897, and April 7, 1898, pages 112 and 513 respectively. You can secure them by remitting 20 cents (10 cents each) to this office.

Powdered Talcum.

(C. T.) Powdered talcum may be purchased through any of the following importers in this city: Hammill & Gillespie, No. 240 Front street; R. J. Waddell & Co., No. 52 Beekman street; L. A. Salomon & Brother, No. 216 Pearl street.

Solanum Carolinense.

(C. H. W.) Solanum Carolinense is the botanical name for "horse nettle," a description of which may be found in the last edition of Gray's Manual of Botany. It has recently been recommended as a remedy in the treatment of epilepsy. Its medicinal properties are briefly noted in the last edition of the United States Dispensatory.

Citrine Ointment.

(W. J. F.) See a discussion of the preparation of this ointment in the Era of March 10, 1898, page 364. We think your difficulty was due to the fact that you did not reapply the heat long enough to expel the gas. The Pharmacopoeia does not state the length of time necessary to accomplish this, but it does direct that when the reaction between the lard oil and nitric acid moderates the heat should be reapplied until effervescence ceases. The complete oxidation of the lard oil may be known to be ended when this has been accomplished and a soft solid mass is obtained upon cooling.

To Make Plaster of Paris Set Slower.

(W. J. F.) It is said that the setting of plaster of paris may be retarded by the addition of two to four per cent. of powdered althea root. This addition not only retards the hardening of the plaster, but also enables it to be cut, filed, sawed and turned. An addition of 8 per cent. retards the complete setting of the plaster for about an hour, so that the mass may be used for any purpose where it is to remain plastic during at least a portion of

that time. In the manufacture of cements for plastering and other purposes in which plaster of paris is used, we are told that the rapidity of hardening is regulated by the addition of "overburnt" gypsum, blanc fixe, slacked lime, sand, etc., as determined by the kind of plaster the operator desires to make.

The artificial or precipitated sulphate of lime may be prepared by precipitating calcium chloride with dilute sulphuric acid. The artificial salt is largely used by paper manufacturers as a filling for writing paper, etc., under the name of "pearl hardening." The Wetherspoon Plaster Mills, of this city, are large manufacturers of plaster of paris. We know of no builders who make a specialty of constructing machinery for the purpose.

Prickly Heat Powder.

(J. M. D.) Prickly heat is a common term applied to a variety of lichen developing in small size papules, which are most common on the face and neck. A mild, cooling laxative and local applications, such as the various starch powders, are all that is usually necessary. Here are some formulas:

- | | |
|---------------------------------------|--------------|
| (1) Rice starch | 3 1/4 ounces |
| Powdered orris root | 1 ounce |
| Oil of rose geranium | 5 drops |
| (2) Wheat starch | 3 1/4 ounces |
| Rice starch | 3 1/4 ounces |
| Powdered sweet almond | 7 ounces |
| Oil lavender | 1 dram |
| (3) Powdered starch | 7 ounces |
| Powdered talcum | 3 ounces |
| Magnesium carbonate | 3 ounces |
| Extract white rose, q. s. to perfume. | |

Grahe's Test for Peruvian Bark.

(J. A. T.) An abstract report of this test appears in the Era of November 12, 1896, page 625. Grahe's test is founded on the fact that when cinchona barks containing one or more of their characteristic alkaloids are exposed to destructive distillation a product is obtained of a bright carmine color, which is yielded by no other bark under the same circumstances, and not by cinchona unless it contain one or more of its peculiar alkaloids. Nor do the pure alkaloids afford it; but, if mixed with a little acetic, quinic, tannic, citric, or tartaric acid, they exhibit the reaction, showing that in the bark it takes place between the alkaloids and the organic acids contained in it. Grahe applies the test by heating a piece of the bark weighing from five to ten grains in an ordinary test-tube, and gradually increasing the heat to redness. Whitish smoke, and watery vapor condensing on the surface of the tube, are first given off, which are soon followed by the appearance of redness in the fumes, and by the deposition, an inch above the heated part, of a red pulverulent film, which is gradually changed into a thick, oily liquid, running down the glass in drops or streaks of a fine carmine color (them. Cent. 1858, U. S. Dispensatory, 1894). Grahe further states (Proceedings A. Ph. A. 1858) that the presence of some substances, caustic alkalies, lime, nitric and chromic acids, etc., prevents the production of the red substance, and that by the destructive distillation of the constituents of the bark, quina, cinchonia, etc., severally and collectively, they did not furnish the red substance.

Ownership of the Prescription.

(G. W. H.) We cannot give you any direct references to judicial decisions regarding the ownership of the prescription, though such decisions have been rendered. In the latter part of 1893 (see this journal, January 15, 1894, page 59), was reported a decision of the Supreme Court of Missouri in which a question involving the constitutionality of the law requiring druggists to carefully preserve all prescriptions compounded by them, or those in their employ, numbering, dating and filing them in the order in which they are compounded, etc., and producing them in a court or before a Grand Jury when required, was contested. In this case the court held that the prescription should remain in the custody of the druggist, and therefore it would seem that the customer and the physician would have no right to it, for the decision upheld the law. Upon the other hand, in 1892 we believe, a lower court in Detroit, Mich., decided the ownership question in favor of the customer although the result might have been otherwise had the case been carried

to the Supreme Court. Again a Cincinnati court (Meyer Brothers Druggist, October, 1892, page 343), rendered the following decision:

"A druggist is under no obligations to furnish a copy nor to permit any one to make a copy of prescriptions. When he has compounded a drug and delivered it to the proper party, the paper upon which the prescription is written becomes his. Druggists keep prescriptions for their own protection. If, as the plaintiff testified, defendant had agreed to furnish plaintiff with a copy whenever he called for it, that agreement was gratuitous and without consideration, and therefore void."

The ownership of the prescription is defined by law in a few of the States, inasmuch as the druggist is required to keep the prescription he fills on file for a given number of years. See this journal, January 13, 1898, page 54.

Destroying Roaches.

(A. D.) A good plan is to render the place which the roaches frequent perfectly dry, and then coat the boards or shelves with a strong decoction of quassia. When this has become thoroughly dry, cover the boards, etc., with clean paper. Other bitter substances may be used in place of quassia. In places where articles of food, drink, or clothing are not likely to be placed, some poisonous substance, such as corrosive sublimate, may be employed. But great care should be taken that it be not applied in such manner that it can eventually be brushed off in dust. A good plan is to dissolve a little shellac in solution of borax, to add a very small quantity of bichloride, and to paint the solution into the cracks and corners. If water or dampness is kept away from the shelves or closets, the roaches will leave the place of their own accord.

The following formulas are also recommended:

- (1) Plaster of Paris..... 8 ounces
- Oatmeal 16 ounces
- Sugar 4 ounces
- (2) Angelica root in fine powder..... 100 parts
- Essence of eucalyptus..... 20 parts

Scatter at night plentifully around the haunts of the pests.

The Era Formulary gives this one:

- (3) Thymol 2 parts
 - Salicylic acid 2 parts
 - Alcohol 200 parts
 - Oil of lemon 1 part
- This preparation makes no stain and is said to kill roaches and vermin immediately. The odor is not unpleasant and is quickly removed by airing the room.
- (4) Chamomile 2 ounces
 - Borax 12 ounces
 - Insect powder 2 ounces
 - Plaster of Paris..... 1 ounce
 - Sulphur 3 ounces
 - Crude arsenic (so-called cobalt)..... 120 grains

Sterilized Milk.

(J. R. J.) Considerable information containing sterilized milk has been published in previous volumes of the Era. These references may be readily found by consulting the indexes. However, by "sterilized milk" is to be understood milk which has been raised and kept for a longer or shorter time at the boiling point of water. By employing heat in this way, it is believed that the bacterial life in the milk is rendered innocuous, and the various micro-organisms are entirely destroyed. A similar process is that known as pasteurization, by which the milk is subjected to a temperature of about 158° F., and kept at that temperature long enough to destroy all, or nearly all, of the bacteria which it may have contained. It is then rapidly cooled. Campbell and some others prefer pasteurized milk to sterilized milk on the following grounds: 1 The digestibility of the casein is diminished only to a slight extent. 2 The taste and smell of the milk are not permanently altered. 3 Less carbonic dioxide is driven off, and 4 The condition of the fat remains practically unchanged. The main disadvantage to sterilized milk claimed by some is that the casein is less digestible than in unsterilized milk. Woodhead gives the following directions for sterilizing milk for domestic purposes. The vessel in which the milk is contained should be placed in a saucepan containing a quantity of cold water equal to the bulk of the milk to be sterilized. The vessel in which the milk is contained should not be closed, and there should be means of stirring it from time to time so as to maintain an even temperature and the

diffusion of the cream. "The water should be boiled over a brisk flame in order that the best results may be obtained, and the heating process should be continued until the temperature throughout the milk has risen to from 88° C. to 92° C.; in most cases this takes place at the end of about twenty-five minutes; but in order to be perfectly safe it may be recommended that every quart of milk treated in this fashion should be heated for half an hour; that is, for about twenty minutes after the water in the outer pan has begun to boil." Milk, he adds, treated in this manner may be looked upon "as perfectly innocuous, even though it should contain the bodies of a considerable number of tubercle bacilli." Morris gives the following directions for sterilizing milk: Place the milk in a clean bottle and plug the mouth with clean cotton wool. Then stand the bottle in a suitable metal vessel so that it is raised about half an inch from the bottom, pour cold water into this vessel until it attains the level of the milk, and heat slowly until the temperature of the water reaches the boiling point. Now take the vessel from the fire and cover over loosely with a piece of woolen cloth for half an hour, after which remove the bottle and store it in a cool place.

Various apparatuses have been devised for sterilizing milk which may be obtained from dealers in druggists' glassware, sundries, etc. Address Whitall, Tatum & Co., this city, or Wilmot Castle & Co., Rochester, N. Y., for descriptive circular of the sterilizers manufactured by them.

Aurum Mosaicum.

(W. J. F.) "Aurum mosaicum" or stannic sulphide, SnS_2 , is not used in veterinary medicine at the present time. It has been used, however, and at one time was official in the Edinburgh Pharmacopoeia. A similar preparation was also official in the London Pharmacopoeia under the title of "aurum musivum." To quote the author of the New Dispensatory (London, 1753) these preparations were "formerly held in considerable esteem in hysterical and hypochondriacal complaints, malignant fevers, and venereal disorders. They were recommended in these last from a supposition of their being mercurials," etc. A later writer (Coxe American Dispensatory, Philadelphia, 1806), speaks of what "seems to be a sulphuretted oxide of tin" found in "Blains's powder," which preparation he quaintly remarks "certainly succeeds sometimes in curing the distemper in dogs."

Mosaic gold is well known in commerce under the familiar title of "bronze-powder," and as such it is used as a pigment for the purpose of bronzing articles of gypsum, wood, iron, etc. The history of this compound is of interest and its discovery is generally attributed to Kunkel. He does not indeed speak of a sublimation of sulphide of tin and sal-ammoniac, but expresses himself so vaguely that it is impossible to recognize this compound from his description (Roscoe & Schorlemmer). However, as noted above, the compound was well known in the eighteenth century under the names of mosaic gold, aurum mosaicum, or musivum (musivum) and it was then prepared as it is at the present day by subliming a mixture of tin amalgam, sulphur, and sal-ammoniac. Thus to quote the formula of the Edinburgh Pharmacopoeia of 1750: "Take of the amalgam of tin, six ounces; sal-ammoniac, and flowers of sulphur, of each three ounces. Grind and mix them well together in a marble mortar; put the mixture into a cucurbit, and apply at first a gentle heat, which is to be raised by slow degrees to the utmost. When the process is finished, break the vessel; the mosaic gold will be found in the bottom, and the scoriate, or dross, above it." That this compound did not contain mercury, as was supposed, was shown by Woulfe in 1771, who described other methods for its production. Thus, it is obtained in the form of a fine pigment by heating 18 parts of tin amalgam containing six parts of mercury with six parts of sal-ammoniac and seven parts of sulphur, when sal-ammoniac, mercuric chloride, and stannous chloride sublime and stannic sulphide remains behind in the form of golden yellow scales. It may also be prepared by heating tin monosulphide with eight parts of corrosive sublimate or by subliming tin filings with sal-ammoniac and sulphur. It is said the exact chemical composition was ascertained by J. Davy and Berzelius in 1812.

PHARMACY.

DENATURATION OF ALCOHOL WITH BENZOL IS recommended, as it not only renders the alcohol unfit for internal use, but is also very difficult to eliminate by distillation, since the boiling points of alcohol and benzol are nearly the same. In view of the increasing uses of alcohol for lighting purposes, denaturation with pyridine may become impracticable, as this substance is not produced in sufficient quantity. (Ph. Post.).

LANCASTER'S MIXTURE FOR WHOOPING COUGH.

Tincture belladonna.....10 parts
Phenacetin.....5 parts
Brandy.....15 parts
Fluid extract chestnut leaves.....60 parts

Mix. Ten drops to be given every two to six hours to a child one year old; to one 10 years old as much as a teaspoonful may be given.

SPIRIT OF NITROUS ETHER is best prepared according to Ph. Ztg. by dissolving the requisite amount of pure ethyl nitrite and 5 per cent. of glycerin in absolute alcohol. The spirit so prepared keeps perfectly and differs from the ordinary product in containing no aldehyde and other byproducts, as well as in having a different odor and taste. (Ph. Post.)

FLASHLIGHT POWDERS.—(I.) Powdered magnesium, 4 parts; potassium permanganate, 4 parts; barium dioxide, 2 parts. (II.) Powdered aluminum, 5 parts; antimonious sulphide, 1 part; potassium nitrate, 2½ parts; potassium chlorate, 12 parts. (III.) Potassium chlorate, 5 parts; potassium ferrocyanide, 0.5 part; sugar, 0.32 part; powdered aluminum, 60 parts. (Ap. Ztg.)

SCHWARTZ'S ANTISEPTIC POWDER.

Iodoform,
Sulfol,
Eismuth subnitrate,
Charcoal,
Cinchona,
Benzoin, of each, equal parts.

Separately powder and mix well. Useful for suppurating surfaces.

ERE'S TONIC PILLS.—Iron lactate from 45 to 75 grains; aqueous extract cinchona, 75 grains; alcoholic extract nux vomica, from 6 to 8 grains; extract of gentian, a sufficiency. Mix and divide into 100 pills. One or two to be taken three times a day, after meals. These pills are used in the treatment of tabes, after a mercurial course. (N. Y. Med. Journal.)

EXTRACT OF OX GALL.—The extract is prepared by Gautier from fresh, decolorized gall and is sterilized. The yield is one-tenth of the gall. The dose is 0.2 to 0.3 Gm. (3 to 5 grains) daily in the form of pills. It is recommended to continue its administration in the treatment for gall stones for several months. The action of the biliary salts so absorbed appears to be principally to facilitate solution of the cholesterol. (Ap. Ztg.)

CEMENT FOR RUBBER TIRES.—(I.) Dissolve 9 parts of rubber and 15 parts of mastic in 60 parts of chloroform. (II.) Dissolve 30 parts of rubber in 600 parts of chloroform. Further, fuse together 30 parts of rubber in small pieces and 12 parts of rosin; add 5.4 parts of Venetian turpentine and dissolve the partially cooled mass in 110 parts of oil of turpentine; the solutions are used mixed. (Drog. Ztg.)

EUCAINE B.—Reclus and Pouchet have made comparative experiments with Eucaine B. and Cocaine, and reached the following conclusions of their relative value: Eucaine B. is preferable in some cases, as it can be sterilized with heat without chemical alteration. In other respects, cocaine, used cautiously, is the better anesthetic. In cases where the operations require large quantities of anesthetic, Eucaine B. is preferable, as it is less toxic. (Ap. Ztg.)

NEW BLEACHING AGENT.—A revolution in the bleaching industry is pending, which promises to be as great as that caused by the introduction of chlorine water by Berthollet in 1785, and particularly by the preparation of chloride of lime in 1790 by Tennant in Glasgow. The innovation consists in the employment of electrolytic bleaching fluids, which are already used extensively in the bleaching of cellulose for the manufacture of paper. Electrolytically liberated chlorine is preferable to that acting in chloride of lime, as it does not injure the luster of fibers, and is also more economical. The persulphates and percarbonates are very useful bleaching agents, but high prices still make their employment prohibitive. (Sudd. Ap. Ztg.)

MANUFACTURE OF NITRIC ACID.—In the ordinary method of manufacture, distillation of Chili saltpeter (sodium nitrate) with sulphuric acid, it is necessary to raise the temperature to over 220° C., which entails considerable decomposition of nitric acid and formation of lower oxides of nitrogen. Valentin (Electrotech. Rdsch.) avoids this decomposition to a great extent by distilling in a partial vacuum, which enables the process to go on at a much lower temperature and also permits a saving of fuel. In this manner a yield of 55 per cent. of the theoretically possible quantity of pure acid of 48° Bé may be obtained. By employing a three-ways-stopcock the distillate may be collected in fractions, and when the first and last fractions are collected separately, sulphuric acid of any strength may be used. Ordinarily an acid of 60° Bé (57 per cent.) is used. The apparatus consists essentially of a retort and two condensing worms. The vacuum apparatus is connected with vessels containing alkaline solution, to retain acid vapors. (Ap. Ztg.)

PREPARATION AND PROPERTIES OF CROTON OIL.—In view of the conflicting statements regarding croton oil, Javillier (Jour. de Ph. et Ch.) has made a series of experiments, and has prepared the oil by three different methods from the same seed. One sample was obtained by expression, another by extraction with ether, and a third by digestion with alcohol at 75° C., and later at 95°. The first oil was amber colored, the second yellow and the third deep brown, almost black. The yields were, respectively, 12.5, 38 and 12 per cent. The oils obtained by expression and by extraction with ether mixed clear with something less than an equal volume of alcohol, but on further addition of alcohol the solution separated into two layers. On warming 1 volume of either of the two oils with 2 volumes of absolute alcohol to 75° C., clear solutions were obtained, but upon cooling about 80 per cent. of oil again separated. The oil prepared by hot digestion of the seed with the alcohol was found soluble in cold alcohol. The first two oils congealed completely at -7° C., the third at -8° C. All of them, however, became semi-solid at a temperature above 0° C. (Ap. Ztg.)

SERVATOL SOAP is the name of a new disinfecting soap containing mercury oxycyanide, intended to replace corrosive sublimate soap. The latter is often ineffective because of a gradual decomposition of the sublimate through the alkali of the soap. Even in the case of soaps containing an excess of fatty acids there is no full guarantee against decomposition. An analysis of four different sublimate soaps, two of them containing an excess of fat, showed only one-third of the required content of mercuric chloride, while metallic mercury and several mercury compounds had separated. It is certain that super-fatted or acid soaps are not equal to neutral and alkaline soaps in cleansing and disinfecting effects, and the antiseptic constituents do not obtain full power of action. Experiments with mercury oxycyanide have shown it in every way superior to corrosive sublimate, as it is not subject to decomposition, does not attack iron, nickel, silver and tin, forms no insoluble compounds with albumen, is non-irritant and destroys the bacteria of cholera, typhus, diphtheria, etc. in a few minutes, when used in form of a ten-fold dilution of a 2 per cent. soap. The soap is placed on the market in solid and in semi-fluid form. (Ph. Post.)

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission

Vol. XX.

NEW YORK, JULY 14, 1898.

No. 2.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483,
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL 35	Watch Druggists..... 51
ORIGINAL AND SE- LECTED PAPERS..... 35	President Dolber Re- ceives Letter: Jersey City Retailers Object: Telephone Rate Low- ered: What Retailers Say About It 52
Debt of the World to Pure Science 35	No Supplemental Law Till Next Congress: Low Prices in St. Louis..... 53
Drugs, Druggists and Lit- erature 42	Obtained Goods Under False Pretenses: West- ern Merchants to Visit New York: To Revise Patent Laws: Explo- sions; German Apothe- caries' Outlook: Fifteen Years for Assaulting a Druggist 54
New-Old Methods in Med- icine 43	NEWS LETTERS 55
Examination Questions Oregon Board 44	ASSOCIATIONS; Torrey Botanical Club 62
Gerarde and the Gerar- dias 45	Maine, Virginia and Ken- tucky Associations; German Apothecaries... 63
PHARMACY 46	BOARDS OF PHAR- MACY 64
QUESTION BOX 47	OPITARY 65
NEWS AND TRADE DEPARTMENT 48	BUSINESS RECORD..... 66
APPLYING THE MEDI- CINE STAMP TAX..... 49	STATE OF TRE 67
Commissioner Not Decid- ed on Pharmacueticals: Liability of Medicinal Preparations to Tax..... 49	MARKET REPORTS..... 68
How Manufacturers Regard the Ruling: Taxa- bility of Proprietary Ar- ticles. Other Decisions.. 50	
Tax on Chewing Gum; Demand for Revenue Stamps; Officials Will	

A PHARMACEUTICAL EDUCATION.

The success attained during the first year of The Era Course in Pharmacy (1897-98) has been something remarkable. Over 1,000 students were enrolled in the Junior class, and the general excellence of the work performed by them is strong evidence that the opportunity afforded by the Course for obtaining a thorough and systematic pharmaceutical education at a small expense is highly appreciated.

The Course is divided into two years, junior and senior, of about 40 weeks each, and covers in scope all the subjects included in the college curriculum. The lectures are published in the Era and quizzes and examinations are conducted by mail. The next term begins September 1st, 1898, with both junior and senior classes. A prospectus, now in preparation, giving full details of courses, outlining method of conducting the work, terms for tuition, etc., will be sent upon request.

Address,

THE PHARMACEUTICAL ERA,

Box 1483, New York.

A Schedule of Medicine Stamp Taxes.

Some misapprehension regarding the amount of stamps to be attached to taxable medicines, etc., will quite likely exist until the matter has been repeatedly explained. Thus we note that our contemporaries, "The Texas Druggist" and the "National Druggist," publish tables of rates which are incorrect in making the rate on 20-cent articles, and in adding 1/4 cent for each 5 cents of retail value up to 50 cents. This gives the correct amount of stamps for 50-cent articles, but not enough for the other prices between 25 and 50 cents. Thus the tax on a 30-cent article is erroneously given as 6-8 cent, a 35 cent article 7/8 cent, and so on.

The law requires 5/8 cent on each additional value of 25 cents or fractional part thereof above the first 25 cents of value. Any article retailing for more than 25 cents and not more than 50 cents, requires 10-8, or 1 1/4 cents in stamps.

There is no provision in the law for dividing the tax rate for prices between 15 and 25 cents, or for fractional parts of each 25 cents in excess of the first 25 cents. The divisions are 5, 10, 15 cents, then a jump to 25 cents, and all taxes above 25 cents are figured at the 5/8 cent rate for each 25 cents or fractional part thereof.

The following might be written or printed on cards and given to each salesman to obviate calculations or danger of getting "mixed up" in making sales.

Retail price.	Stamp.
Not exceeding 5 cents.....	$\frac{1}{8}$ cent.
Above 5c. up to and including 10c.....	2-8c. ($\frac{1}{4}$ c.)
" 10c. " " " 15c.....	3 c.
" 15c. " " " 20c.....	4 c.
" 20c. " " " 25c.....	5c. ($1\frac{1}{8}$ c.)
" 25c. " " " 30c.....	5-8c. ($1\frac{3}{8}$ c.)
" 30c. " " " 35c.....	6-8c. ($1\frac{5}{8}$ c.)
" 35c. " " " 40c.....	7-8c. ($1\frac{7}{8}$ c.)
" 40c. " " " 45c.....	8-8c. (2c.)
" 45c. " " " 50c.....	9-8c. ($2\frac{1}{8}$ c.)
" 50c. " " " 55c.....	10-8c. ($2\frac{3}{8}$ c.)
" 55c. " " " 60c.....	11-8c. ($2\frac{5}{8}$ c.)
" 60c. " " " 65c.....	12-8c. ($2\frac{7}{8}$ c.)
" 65c. " " " 70c.....	13-8c. (3c.)
" 70c. " " " 75c.....	14-8c. ($3\frac{1}{8}$ c.)
" 75c. " " " 80c.....	15-8c. ($3\frac{3}{8}$ c.)
" 80c. " " " 85c.....	16-8c. ($3\frac{5}{8}$ c.)
" 85c. " " " 90c.....	17-8c. ($3\frac{7}{8}$ c.)
" 90c. " " " 95c.....	18-8c. (4c.)
" 95c. " " " 1.00.....	19-8c. ($4\frac{1}{8}$ c.)
" 1.00 " " " 1.05.....	20-8c. ($4\frac{3}{8}$ c.)
" 1.05 " " " 1.10.....	21-8c. ($4\frac{5}{8}$ c.)
" 1.10 " " " 1.15.....	22-8c. ($4\frac{7}{8}$ c.)
" 1.15 " " " 1.20.....	23-8c. (5c.)
" 1.20 " " " 1.25.....	24-8c. ($5\frac{1}{8}$ c.)
" 1.25 " " " 1.30.....	25-8c. ($5\frac{3}{8}$ c.)
" 1.30 " " " 1.35.....	26-8c. ($5\frac{5}{8}$ c.)
" 1.35 " " " 1.40.....	27-8c. ($5\frac{7}{8}$ c.)
" 1.40 " " " 1.45.....	28-8c. (6c.)
" 1.45 " " " 1.50.....	29-8c. ($6\frac{1}{8}$ c.)
" 1.50 " " " 1.55.....	30-8c. ($6\frac{3}{8}$ c.)
" 1.55 " " " 1.60.....	31-8c. ($6\frac{5}{8}$ c.)
" 1.60 " " " 1.65.....	32-8c. ($6\frac{7}{8}$ c.)
" 1.65 " " " 1.70.....	33-8c. (7c.)
" 1.70 " " " 1.75.....	34-8c. ($7\frac{1}{8}$ c.)
" 1.75 " " " 1.80.....	35-8c. ($7\frac{3}{8}$ c.)
" 1.80 " " " 1.85.....	36-8c. ($7\frac{5}{8}$ c.)
" 1.85 " " " 1.90.....	37-8c. ($7\frac{7}{8}$ c.)
" 1.90 " " " 1.95.....	38-8c. (8c.)
" 1.95 " " " 2.00.....	39-8c. ($8\frac{1}{8}$ c.)
" 2.00 " " " 2.05.....	40-8c. ($8\frac{3}{8}$ c.)
" 2.05 " " " 2.10.....	41-8c. ($8\frac{5}{8}$ c.)
" 2.10 " " " 2.15.....	42-8c. ($8\frac{7}{8}$ c.)
" 2.15 " " " 2.20.....	43-8c. (9c.)
" 2.20 " " " 2.25.....	44-8c. ($9\frac{1}{8}$ c.)
" 2.25 " " " 2.30.....	45-8c. ($9\frac{3}{8}$ c.)
" 2.30 " " " 2.35.....	46-8c. ($9\frac{5}{8}$ c.)
" 2.35 " " " 2.40.....	47-8c. ($9\frac{7}{8}$ c.)
" 2.40 " " " 2.45.....	48-8c. (10c.)
" 2.45 " " " 2.50.....	49-8c. ($10\frac{1}{8}$ c.)
" 2.50 " " " 2.55.....	50-8c. ($10\frac{3}{8}$ c.)
" 2.55 " " " 2.60.....	51-8c. ($10\frac{5}{8}$ c.)
" 2.60 " " " 2.65.....	52-8c. ($10\frac{7}{8}$ c.)
" 2.65 " " " 2.70.....	53-8c. (11c.)
" 2.70 " " " 2.75.....	54-8c. ($11\frac{1}{8}$ c.)
" 2.75 " " " 2.80.....	55-8c. ($11\frac{3}{8}$ c.)
" 2.80 " " " 2.85.....	56-8c. ($11\frac{5}{8}$ c.)
" 2.85 " " " 2.90.....	57-8c. ($11\frac{7}{8}$ c.)
" 2.90 " " " 2.95.....	58-8c. (12c.)
" 2.95 " " " 3.00.....	59-8c. ($12\frac{1}{8}$ c.)
" 3.00 " " " 3.05.....	60-8c. ($12\frac{3}{8}$ c.)
" 3.05 " " " 3.10.....	61-8c. ($12\frac{5}{8}$ c.)
" 3.10 " " " 3.15.....	62-8c. ($12\frac{7}{8}$ c.)
" 3.15 " " " 3.20.....	63-8c. (13c.)
" 3.20 " " " 3.25.....	64-8c. ($13\frac{1}{8}$ c.)
" 3.25 " " " 3.30.....	65-8c. ($13\frac{3}{8}$ c.)
" 3.30 " " " 3.35.....	66-8c. ($13\frac{5}{8}$ c.)
" 3.35 " " " 3.40.....	67-8c. ($13\frac{7}{8}$ c.)
" 3.40 " " " 3.45.....	68-8c. (14c.)
" 3.45 " " " 3.50.....	69-8c. ($14\frac{1}{8}$ c.)
" 3.50 " " " 3.55.....	70-8c. ($14\frac{3}{8}$ c.)
" 3.55 " " " 3.60.....	71-8c. ($14\frac{5}{8}$ c.)
" 3.60 " " " 3.65.....	72-8c. ($14\frac{7}{8}$ c.)
" 3.65 " " " 3.70.....	73-8c. (15c.)
" 3.70 " " " 3.75.....	74-8c. ($15\frac{1}{8}$ c.)
" 3.75 " " " 3.80.....	75-8c. ($15\frac{3}{8}$ c.)
" 3.80 " " " 3.85.....	76-8c. ($15\frac{5}{8}$ c.)
" 3.85 " " " 3.90.....	77-8c. ($15\frac{7}{8}$ c.)
" 3.90 " " " 3.95.....	78-8c. (16c.)
" 3.95 " " " 4.00.....	79-8c. ($16\frac{1}{8}$ c.)
" 4.00 " " " 4.05.....	80-8c. ($16\frac{3}{8}$ c.)
" 4.05 " " " 4.10.....	81-8c. ($16\frac{5}{8}$ c.)
" 4.10 " " " 4.15.....	82-8c. ($16\frac{7}{8}$ c.)
" 4.15 " " " 4.20.....	83-8c. (17c.)
" 4.20 " " " 4.25.....	84-8c. ($17\frac{1}{8}$ c.)
" 4.25 " " " 4.30.....	85-8c. ($17\frac{3}{8}$ c.)
" 4.30 " " " 4.35.....	86-8c. ($17\frac{5}{8}$ c.)
" 4.35 " " " 4.40.....	87-8c. ($17\frac{7}{8}$ c.)
" 4.40 " " " 4.45.....	88-8c. (18c.)
" 4.45 " " " 4.50.....	89-8c. ($18\frac{1}{8}$ c.)
" 4.50 " " " 4.55.....	90-8c. ($18\frac{3}{8}$ c.)
" 4.55 " " " 4.60.....	91-8c. ($18\frac{5}{8}$ c.)
" 4.60 " " " 4.65.....	92-8c. ($18\frac{7}{8}$ c.)
" 4.65 " " " 4.70.....	93-8c. (19c.)
" 4.70 " " " 4.75.....	94-8c. ($19\frac{1}{8}$ c.)
" 4.75 " " " 4.80.....	95-8c. ($19\frac{3}{8}$ c.)
" 4.80 " " " 4.85.....	96-8c. ($19\frac{5}{8}$ c.)
" 4.85 " " " 4.90.....	97-8c. ($19\frac{7}{8}$ c.)
" 4.90 " " " 4.95.....	98-8c. (20c.)
" 4.95 " " " 5.00.....	99-8c. ($20\frac{1}{8}$ c.)
" 5.00 " " " 5.05.....	100-8c. ($20\frac{3}{8}$ c.)
" 5.05 " " " 5.10.....	101-8c. ($20\frac{5}{8}$ c.)
" 5.10 " " " 5.15.....	102-8c. ($20\frac{7}{8}$ c.)
" 5.15 " " " 5.20.....	103-8c. (21c.)
" 5.20 " " " 5.25.....	104-8c. ($21\frac{1}{8}$ c.)
" 5.25 " " " 5.30.....	105-8c. ($21\frac{3}{8}$ c.)
" 5.30 " " " 5.35.....	106-8c. ($21\frac{5}{8}$ c.)
" 5.35 " " " 5.40.....	107-8c. ($21\frac{7}{8}$ c.)
" 5.40 " " " 5.45.....	108-8c. (22c.)
" 5.45 " " " 5.50.....	109-8c. ($22\frac{1}{8}$ c.)
" 5.50 " " " 5.55.....	110-8c. ($22\frac{3}{8}$ c.)
" 5.55 " " " 5.60.....	111-8c. ($22\frac{5}{8}$ c.)
" 5.60 " " " 5.65.....	112-8c. ($22\frac{7}{8}$ c.)
" 5.65 " " " 5.70.....	113-8c. (23c.)
" 5.70 " " " 5.75.....	114-8c. ($23\frac{1}{8}$ c.)
" 5.75 " " " 5.80.....	115-8c. ($23\frac{3}{8}$ c.)
" 5.80 " " " 5.85.....	116-8c. ($23\frac{5}{8}$ c.)
" 5.85 " " " 5.90.....	117-8c. ($23\frac{7}{8}$ c.)
" 5.90 " " " 5.95.....	118-8c. (24c.)
" 5.95 " " " 6.00.....	119-8c. ($24\frac{1}{8}$ c.)
" 6.00 " " " 6.05.....	120-8c. ($24\frac{3}{8}$ c.)
" 6.05 " " " 6.10.....	121-8c. ($24\frac{5}{8}$ c.)
" 6.10 " " " 6.15.....	122-8c. ($24\frac{7}{8}$ c.)
" 6.15 " " " 6.20.....	123-8c. (25c.)
" 6.20 " " " 6.25.....	124-8c. ($25\frac{1}{8}$ c.)
" 6.25 " " " 6.30.....	125-8c. ($25\frac{3}{8}$ c.)
" 6.30 " " " 6.35.....	126-8c. ($25\frac{5}{8}$ c.)
" 6.35 " " " 6.40.....	127-8c. ($25\frac{7}{8}$ c.)
" 6.40 " " " 6.45.....	128-8c. (26c.)
" 6.45 " " " 6.50.....	129-8c. ($26\frac{1}{8}$ c.)
" 6.50 " " " 6.55.....	130-8c. ($26\frac{3}{8}$ c.)
" 6.55 " " " 6.60.....	131-8c. ($26\frac{5}{8}$ c.)
" 6.60 " " " 6.65.....	132-8c. ($26\frac{7}{8}$ c.)
" 6.65 " " " 6.70.....	133-8c. (27c.)
" 6.70 " " " 6.75.....	134-8c. ($27\frac{1}{8}$ c.)
" 6.75 " " " 6.80.....	135-8c. ($27\frac{3}{8}$ c.)
" 6.80 " " " 6.85.....	136-8c. ($27\frac{5}{8}$ c.)
" 6.85 " " " 6.90.....	137-8c. ($27\frac{7}{8}$ c.)
" 6.90 " " " 6.95.....	138-8c. (28c.)
" 6.95 " " " 7.00.....	139-8c. ($28\frac{1}{8}$ c.)
" 7.00 " " " 7.05.....	140-8c. ($28\frac{3}{8}$ c.)
" 7.05 " " " 7.10.....	141-8c. ($28\frac{5}{8}$ c.)
" 7.10 " " " 7.15.....	142-8c. ($28\frac{7}{8}$ c.)
" 7.15 " " " 7.20.....	143-8c. (29c.)
" 7.20 " " " 7.25.....	144-8c. ($29\frac{1}{8}$ c.)
" 7.25 " " " 7.30.....	145-8c. ($29\frac{3}{8}$ c.)
" 7.30 " " " 7.35.....	146-8c. ($29\frac{5}{8}$ c.)
" 7.35 " " " 7.40.....	147-8c. ($29\frac{7}{8}$ c.)
" 7.40 " " " 7.45.....	148-8c. (30c.)
" 7.45 " " " 7.50.....	149-8c. ($30\frac{1}{8}$ c.)
" 7.50 " " " 7.55.....	150-8c. ($30\frac{3}{8}$ c.)
" 7.55 " " " 7.60.....	151-8c. ($30\frac{5}{8}$ c.)
" 7.60 " " " 7.65.....	152-8c. ($30\frac{7}{8}$ c.)
" 7.65 " " " 7.70.....	153-8c. (31c.)
" 7.70 " " " 7.75.....	154-8c. ($31\frac{1}{8}$ c.)
" 7.75 " " " 7.80.....	155-8c. ($31\frac{3}{8}$ c.)
" 7.80 " " " 7.85.....	156-8c. ($31\frac{5}{8}$ c.)
" 7.85 " " " 7.90.....	157-8c. ($31\frac{7}{8}$ c.)
" 7.90 " " " 7.95.....	158-8c. (32c.)
" 7.95 " " " 8.00.....	159-8c. ($32\frac{1}{8}$ c.)
" 8.00 " " " 8.05.....	160-8c. ($32\frac{3}{8}$ c.)
" 8.05 " " " 8.10.....	161-8c. ($32\frac{5}{8}$ c.)
" 8.10 " " " 8.15.....	162-8c. ($32\frac{7}{8}$ c.)
" 8.15 " " " 8.20.....	163-8c. (33c.)
" 8.20 " " " 8.25.....	164-8c. ($33\frac{1}{8}$ c.)
" 8.25 " " " 8.30.....	165-8c. ($33\frac{3}{8}$ c.)
" 8.30 " " " 8.35.....	166-8c. ($33\frac{5}{8}$ c.)
" 8.35 " " " 8.40.....	167-8c. ($33\frac{7}{8}$ c.)
" 8.40 " " " 8.45.....	168-8c. (34c.)
" 8.45 " " " 8.50.....	169-8c. ($34\frac{1}{8}$ c.)
" 8.50 " " " 8.55.....	170-8c. ($34\frac{3}{8}$ c.)
" 8.55 " " " 8.60.....	171-8c. ($34\frac{5}{8}$ c.)
" 8.60 " " " 8.65.....	172-8c. ($34\frac{7}{8}$ c.)
" 8.65 " " " 8.70.....	173-8c. (35c.)
" 8.70 " " " 8.75.....	174-8c. ($35\frac{1}{8}$ c.)
" 8.75 " " " 8.80.....	175-8c. ($35\frac{3}{8}$ c.)
" 8.80 " " " 8.85.....	176-8c. ($35\frac{5}{8}$ c.)
" 8.85 " " " 8.90.....	177-8c. ($35\frac{7}{8}$ c.)
" 8.90 " " " 8.95.....	178-8c. (36c.)
" 8.95 " " " 9.00.....	179-8c. ($36\frac{1}{8}$ c.)
" 9.00 " " " 9.05.....	180-8c. ($36\frac{3}{8}$ c.)
" 9.05 " " " 9.10.....	181-8c. ($36\frac{5}{8}$ c.)
" 9.10 " " " 9.15.....	182-8c. ($36\frac{7}{8}$ c.)
" 9.15 " " " 9.20.....	183-8c. (37c.)
" 9.20 " " " 9.25.....	184-8c. ($37\frac{1}{8}$ c.)
" 9.25 " " " 9.30.....	185-8c. ($37\frac{3}{8}$ c.)
" 9.30 " " " 9.35.....	186-8c. ($37\frac{5}{8}$ c.)
" 9.35 " " " 9.40.....	187-8c. ($37\frac{7}{8}$ c.)
" 9.40 " " " 9.45.....	188-8c. (38c.)
" 9.45 " " " 9.50.....	189-8c. ($38\frac{1}{8}$ c.)
" 9.50 " " " 9.55.....	190-8c. ($38\frac{3}{8}$ c.)
" 9.55 " " " 9.60.....	191-8c. ($38\frac{5}{8}$ c.)
" 9.60 " " " 9.65.....	192-8c. ($38\frac{7}{8}$ c.)
" 9.65 " " " 9.70.....	193-8c. (39c.)
" 9.70 " " " 9.75.....	194-8c. ($39\frac{1}{8}$ c.)
" 9.75 " " " 9.80.....	195-8c. ($39\frac{3}{8}$ c.)
" 9.80 " " " 9.85.....	196-8c. ($39\frac{5}{8}$ c.)
" 9.85 " " " 9.90.....	197-8c. ($39\frac{7}{8}$ c.)
" 9.90 " " " 9.95.....	198-8c. (40c.)
" 9.95 " " " 10.00.....	199-8c. ($40\frac{1}{8}$ c.)

and signed by all the druggists of that town, is a fair indication of the action of the several bodies named:

Whereas, The proprietary remedy manufacturers of the United States are endeavoring to not only thrust the entire burden of the recently enacted war tax on medicines upon the retail druggists of the country, but are also adding much more than the actual tax to the price of their remedies, thereby endeavoring to take advantage of the patriotism of the people to increase their profits, we the undersigned druggists of Muncie, in meeting assembled, do hereby

Resolve, That we will not handle any remedy on which the price has now been or hereafter shall be advanced to meet the said war tax, and that we will use our best efforts to discourage the sale of such remedies. Be it further

Resolved, That a copy of these resolutions be furnished the leading drug journals and also the newspapers of the country, and that all retail druggists are requested to take similar action.

In reference to this Muncie case, it is announced that the proprietors thus boycotted will in revenge combine and start a store in Muncie for the sale of their remedies, but this dire threat seems not to frighten the druggists very greatly.

Besides this definite and radical action of a number of druggists' associations, a great many other similar bodies are nibbling at the bait. They have already decided to raise the retail selling prices of patent medicines, in most cases not merely enough to cover the tax, but considerably more, in order to regain some of their lost profits of previous years (the plan so strongly urged by this journal). This action has been taken by associations of druggists in Worcester, Mass., Indianapolis, Ind., Asbury Park, N. J., Deadwood, S. D., Elizabeth, N. J., Omaha, Neb., Syracuse, N. Y., Joliet, Ill., Colorado Springs, Col., Jersey City, N. J., New Haven, Conn., Montpelier, Vt., and Shenandoah, Pa.

And so all over the country druggists are combining for their own protection. Some are merely trying to preserve some sort of profit on patent medicines, but others go to greater lengths and propose to fight the proprietors. This trade emergency which has arisen has impressed upon the retail drug trade the desirability and the necessity of strong local organizations for mutual protection and advantage, and if it thoroughly teaches this lesson, a very great good will have been done the retail profession. In many localities the druggists have grown to look upon the patent medicine man as their natural enemy. They have been handling his goods for years with little or no profit, and they see in his present proposal to raise his prices only an additional attack upon them. There is a strong feeling of resentment, a consciousness of ill treatment, and a desire for revenge and retaliation which are brought to the surface by the present war stamp tax agitation. It is a sign of the times which is unmistakable, and which he may read who runs. The ultimate outcome thereof can, we believe, be safely predicted as the combination and coalition of the retail drug trade of the United States into a strong national body to look after their commercial interests only, and which shall be fed and sustained by harmoniously working local associations. The American Pharmaceutical Association, though proving itself abundantly capable to look after the professional and educational interests of the trade, has been woefully deficient in guarding the commercial interests, and it is almost sure that within a very short time a national retail druggists' commercial association will be formed (mapped out on much broader

lines than those of the organization which came to grief a few years ago because of its narrowness).

So we call the attention of the wholesale and manufacturing branches to these signs of the times. Let the proprietor carefully consider his policy and plan of action. Druggists are now beginning to say, give us our rights!

Why Not? Because.

We have received the following two letters:

1.—"Your Extra of June 29 is at hand, and as a retailer and reader of your journal I extend my hearty thanks. You have done the trade a good deed. I am also specially interested in your questions to the Commissioner at Washington. But how in the name of common sense can Commissioner Scott say what you report in Era, June 29, p. 989: 'Gentlemen, this country is at war,' etc. It is the merest twaddle I ever heard from one supposed to know, or ought to know, something on the matter. The law to us hereabouts, laymen and lawyers, seems explicit, that only proprietary goods are to be stamped. Shall we pour a little castor oil on a man's boots and then stamp the boots? It is bad enough to put the poor piller under the harrow without making it revolve. In fact, he has for years been under the harrow, and now of all trades he is selected to carry the war burden. But no more of this. I for one am disgusted."

2.—"Your War Tax Extra on page 20 on fine lines is very interesting. Allow me to call your attention to the following: Liquid smoke, preservative, fly papers, liquid bronzes, liquid glues, mucilage, dyes, foods, malt extracts, stock foods, catsups, flavoring extracts, mince meats. Worcester (or other) sauces, laundry blue and soap, fancy soda water extracts, baking powders, china and rubber cements, razor paste, sheep dip, soiled dressings, perfumery, candle, ink, erasers, solid and liquid boot and shoe polish, metal polish and plating, axle grease, celery salt, pepso salt, self-raising flour, canned soups, washing powders and compounds, embalming fluid; these claim to cure or do more or less good to mankind. All are private formulas and in various lines, and are no more a necessity than a box of pills. Tax all secret formulas and trade marks, revolvers, guns, photographs, (all doctors that dispense themselves)."

These letters are merely samples of the very general protest voiced by the retail druggists of the country. All feel that there has been unjust discrimination in singling out medicines for taxation. But the fiat has gone forth, and there is nothing now to be done except to bear the burden. Those who have followed the course of the stamp tax discussion and legislation, however, will remember that the bill was subjected to many amendments, revisions and alterations before assuming the final form in which it was enacted. At one time it contained the provision that all proprietary articles (not medicines alone), should be taxed. This was a logical, just and equitable measure, for there is no reason why a proprietary medicine should be taxed, while a proprietary baking powder or shoe polish should escape. The primary object of the bill was supposed to be the distribution of the tax upon all who in any way claimed proprietary rights in their productions, and who were afforded patent, trade mark or copyright protection by the Government. They were asked in return for this protection to pay a very small stamp tax, but the omnibus nature of this provision was no sooner understood than every Tom, Dick and Harry in the country who made a mowing machine, typewriter, table saw, etc., commenced to flood the authorities at Washington, the Senators, the newspapers, with protests declamatory and exclamatory: the final

result being that the measure was again amended to its original form to apply only to medicines. We sympathize with our correspondents in their feeling of exasperation, but the whole position of affairs, the reason therefor, is tersely, yet comprehensively, set forth in the caption of these few remarks.

Coal Tar Colors and Confectionery.

Some time ago Prof. Cochran, of the Department of Agriculture of the State of Pennsylvania, submitted a report of an investigation he had made of coal tar colors taken from confectionery bought in open market. He did not find any of them to be poisonous, but in view of the very general use of these colors by confectioners and the well known fact that some coal tar colors are injurious, he believed there was some danger that poisonous compounds of this character might find their way into confectionery. That there is some ground for this belief is evident from the interesting discussion on the subject by the members of the National Confectioners' Association, at its recent meeting in Chicago. One member seemed to voice the sentiment of the association when he said there are a great many coal tar colors which may be used with safety by confectioners, but upon the other hand there are some that are not safe, are poisonous or at least have disagreeable effects or interfere with digestion, and, consequently, should not be used. He said there might be attempts on the part of State legislatures to discriminate against all coal tar colors, an action which the association should resist. Coal tar colors are a necessity for confectioners at this time, for no vegetable colors will give the results desired.

This discussion from the viewpoint of the manufacturing confectioner, shows that he is aroused to the possible dangers of the situation, and he believes he has the right to rest the responsibility of flooding the country with injurious colors upon the manufacturer of colors. For his part, he proposes to demand a sufficient guarantee that the colors he buys shall be harmless, for his "association, whose sole object is to see that everything used in confectionery shall be pure and wholesome, would be severely criticised if any of its members were found using colors that are poisonous."

An honorable statement and a movement in the right direction. Will the manufacturer of colors give the guarantee?

At a recent meeting of the Minnesota Pharmaceutical Association, one of the members read a very caustic paper airing his views upon a number of trade grievances, and slapping pretty hard at the doctors. It was a breezy paper, and instigated a breezy discussion. It was found that not all present agreed with the author. It was finally decided that the paper should be quite rigorously edited before being inserted in the published proceedings, and farther than this, it was recommended that a censor be appointed to pass upon the eligibility of all papers hereafter. This suggestion crystallized into a resolution to refer all papers to the secretary for approval, with the consent of the author. We are thoroughly in favor of having some one, a censor if you choose, decide what papers shall and what shall not be published. The usual custom of printing all that are presented is open to serious objection. Some of these contributions are not worth the paper they are printed on, and it is just as important to keep out this class as those which are particularly radical and outspoken. Both justice and wisdom should be employed in determining their eligibility.

NOTICE TO STUDENTS OF THE ERA COURSE.

The period within which examination papers can be mailed to the Director's office has been extended to July 30th. Examination papers mailed after that date cannot be considered in the prize contest.

Students in arrears upon any of the recitations can send in their answers any time during the summer, but their grades will not be returned to them until after the opening of the fall term.

The fact that a student has not recited upon all of the lectures of the course does not bar him from taking the examination.

J. H. BEAL,

Director of the Era Course in Pharmacy.

Nine druggists of Paducah, Ky., have been brought up in police court because of their laxity in selling poisonous drugs, especially cocaine, which they did not hesitate to supply freely to negroes asking for it. It is reported that the Druggists' Association will contest the cases. If the druggists have broken the law, and worse than this, have been false to their moral obligations, it would be in better taste for the Druggists' Association to become prosecutors rather than defenders.

In a police raid upon a drug store in Meriden, Kan., recently, there were confiscated seventeen barrels of beer and whisky. It does not strike us that it will be very difficult to prove that this druggist was somewhat exceeding the liquor-selling privileges accorded him as a pharmacist. Seventeen barrels is a very liberal supply for strictly legitimate prescription purposes.

Buffalo druggists, through the Erie County Pharmaceutical Association, have sent out a general circular announcing that they will dispense prescriptions free for the families of soldiers who have gone to the front. Many druggists have agreed to this action and will give from twenty to one hundred prescriptions each. But the stipulation is made that patent and proprietary preparations will not be included.

A West Virginia druggist is charged with burning his store to get the insurance. In these hard times the druggist must get money some way, and as a rule he cannot find much in his business, so we must not be too hard upon this offender, even if the case be proven against him.

One hundred and fifty barrels of peppermint lozenges was a consignment received by a Cincinnati house a short time ago. If the practice of chewing peppermint lozenges in church is still as prevalent as it was in our fathers' time, the odor of sanctity will be very noticeable in Ohio for a long time to come.

Way out in the State of Washington, a druggist named Grieve and a young lady named Boss have been united in marriage. This singular combination of names gives rise to wild imaginings on our part. The lady now Grieve (s) because she is no longer Boss.

HAIR TONIC.—A French medical journal gives the following formula: Quinine hydrochloride, sandalwood, of each 1.5 part; tannic acid, tincture of cantharides, of each, 3.5 parts; glycerine, 20 parts; cologne water, 15 parts; vanillin, 0.02 part; rectified spirit, to make 300 parts. Filter after four days. (Ap. 24g.)

THE DEBT OF THE WORLD TO PURE SCIENCE.*

BY JOHN J. STEVENSON, NEW YORK UNIVERSITY.

The fundamental importance of abstruse research receives too little consideration in our time. The practical side of life is all-absorbent; the results of research are utilized promptly, and full recognition is awarded to the one who utilizes, while the investigator is ignored. The student himself is liable to be regarded as a relic of medieval times, and his unconcern respecting ordinary matters is serviceable to the dramatist and newspaper writer in their times of need.

Yet every thoughtful man, far away as his calling may be from scientific investigation, hesitates to accept such judgment as accurate. Not a few, engrossed in the strife of the market place, are convinced that, even from the selfish standpoint of mere enjoyment, less gain is found in amassing fortunes or in acquiring power over one's fellows than in the effort to solve nature's problems. Men scoff at philosophical dreamers, but the scoffing is not according to knowledge. The exigencies of subjective philosophy brought about the objective philosophy. Error has led to the right. Alchemy prepared the way for chemistry; astrology for astronomy; cosmogony for geology. The birth of inductive science was due to the necessities of deductive science, and the greatest development of the former has come from the trial of hypotheses belonging in the borderland between science and philosophy.

My effort this evening is to show that discoveries, which have proved all-important in secondary results, did not burst forth full grown; that in each case they were, so to say, the crown of a structure reared painfully and noiselessly by men indifferent to this world's affairs, caring little for fame and even less for wealth. Facts were gathered, principles were discovered, each falling into its own place until at last the brilliant crown shone out and the world thought it saw a miracle.

This done, I shall endeavor to draw a moral, which it is hoped will be found worthy of consideration.

The heavenly bodies were objects of adoration from the earliest antiquity; they were guides to caravans on the desert as well as to mariners far from land; they marked the beginning of seasons or, as in Egypt, the limits of vast periods embracing many hundred of years. Maps were made thousand of years ago showing their positions; the path of the sun was determined rudely, the influence of the sun and moon upon the earth was recognized in some degree and their influence upon man was inferred. Beyond these matters, man, with unaided vision and with knowledge of only elementary mathematics, could not go.

Mathematical investigations by Arabian students prepared the means by which, after Europe's revival of learning, one, without wealth, gave a new life to astronomy. Copernicus, early trained in mathematics, during the last thirty years of his life spent the hours stolen from his work as a clerk and charity physician in mathematical and astronomical studies, which led him to reject the complex Ptolemaic system and to accept, in modified form, that bearing the name of Pythagoras. Tycho Brahe followed. A mere star gazer at first, he became an earnest student, improved the instruments employed, and finally secured recognition from his sovereign. For twenty-five years he sought facts, disregarding none, but seldom recognizing economic importance in any. His associate, Kepler, proud by his training under Brahe, carried the work far beyond that of his predecessors—and this in spite of disease, domestic sorrows and only too frequent experience of abject poverty. He divested the Copernican hypothesis of many crudities and discovered the laws which have been utilized by astronomers in all phases of their work. He ascertained the causes of the tides, with the aid of the newly invented telescope made studies of eclipses and occultations and just missed discovering the law of gravitation. He laid the foundation for practical application of astronomy to every-day life.

In the eighteenth century astronomy was recognized by governments as no longer of merely curious interest

and its students received abundant aid. The improvement of the telescope, the discovery of the law of gravitation and the invention of logarithms had made possible the notable advances marking the close of the seventeenth century. The increasing requirements of accuracy led to exactness in the manufacture of instruments, to calculation and recalculation of tables, to long expeditions for testing methods as well as conclusions, until finally the suggestion of Copernicus, the physician, and of Kepler, the ill-fed invalid, became fact, and astronomical results were utilized to the advantage of mankind. The voyager on the ocean and the agriculturist on land alike reap benefit from the accumulated observations of three centuries, though they know nothing of the principles or of the laborers by whom the principles were discovered. The regulation of chronometers as well as the fixing of boundary lines between great nations is determined by methods due to slow accumulation of facts, slower development in analysis and calculations and even slower improvement in instruments.

Galvani's observations that frogs' legs twitch when near a friction machine in operation, led him to test the effect of atmospheric electricity upon them. The instant action brought about the discovery that it was due, not to atmospheric influences, but to a current produced by contact of a copper hook with an iron rail. Volta pursued the investigation and constructed the pile which bears his name. With this, modified, Davy, in 1807, decomposed potash and soda, thereby isolating potassium and sodium. This experiment, repeated successfully by other chemists, was the precursor of many independent investigations, which directed to many lines of research, each increasing in interest as it was followed.

Volta's crown of cups expanded into the clumsy trough batteries which were displaced finally in 1836 by Daniell's constant battery, using two fluids, one of which was cupric sulphate. De la Rue observed that, as the sulphate was reduced, the copper was deposited on the surface of the outer vessel and copied accurately all markings on that surface. Within two or three years Jacob and Spencer made the practical application of this observation by reproducing engravings and medals. Thus was born the science of electro-metallurgy. At first mere curiosities were made, then electro-plating in a wider way, the electrolyte, the utilization of copper to protect more easily destructible metals, the preparation of articles for ornament and utility by covering baser metals with copper or silver or gold, while now the development of electro-generators has led to wide applications in the reduction of metals and to the saving of materials which otherwise would go to waste.

Oersted, in 1819-1820, puzzling over the possible relations of voltaic electricity to magnetism, noticed that a conductor carrying an electrical current becomes itself a magnet and deflects the needle. Sturgeon, working along the same lines, found that soft iron inclosed in a coil, through which a current passes, becomes magnetic, but loses the power when the current ceases. This opened the way for our own Henry's all-important discovery of the reciprocating electro-magnets and the vibrating armature—the essential parts of the magnetic telegraph. Henry actually constructed a telegraph in 1832, winding the wires around his class room in Albany and using a bell to record the making and breaking signals. Here, as he fully recognized, was everything but a simple device for receiving signals.

Several years later Prof. Morse, dreaming night and day of the telegraph, was experimenting with Moll's electro-magnet and finding only discouragement. His colleague, Prof. Gale, advised him to discard the even then antiquated apparatus and to utilize the results given in Henry's discussion. At once the condition was changed, and soon the ingenious recording instrument bearing Morse's name was constructed. Henry's scientific discoveries were transmuted by the inventor's ingenuity into substantial glory for Morse and proved a source of inconvertible advantage to the whole civilized world. Steinhal's discovery that the earth can be utilized for the return current completed the series of fundamental discoveries, and since that time everything has been elaboration.

Oersted's discovery respecting the influence of an electric current, closely followed by that of Arago in the same

* Presidential address delivered at the annual meeting of the New York Academy of Sciences, from Science; (Sci. Am. Supplement.)

direction, opened the way for Faraday's complete discovery of induction, which underlies the construction of the dynamo. This ascertained the province of the inventor was well defined—to conjure some mechanical appliance whereby the principle might be utilized. But here, as elsewhere, the work of discovery and that of invention went on almost pari passu; the results of each increased those of the other. The distance from the Clark and Page machines of the middle thirties, with their cumbersome horseshoe magnets and disproportionate expenditure of power, to the Siemens machine of the fifties was long; but it was no leap. In like manner, slow steps marked progress thence to the Gramme machine, in which one finds the outgrowth of many years of labor by many men, both investigators and inventors. In 1870, forty years after Faraday's announcement of the basal principle, the stage was reached whence progress could be rapid. Since that time the dynamo has been brought into such a stage of efficiency that the electro-motor seems likely to displace not merely the steam engine, but also other agencies in direct application of force. The horse is passing away and the trolley road runs along the country highway; the longer railways are considering the wisdom of changing their power; cities are lighted brilliantly where formerly the gloom invited highwaymen to ply their trade; and even the kitchen is invaded by new methods of heating.

Long ago it was known that, if the refining of pig iron be stopped just before the tendency to solidify became pronounced, the wrought iron is more durable than that obtained in the completed process. Thus imperfectly refined metal was made frequently, though unintentionally and ignorantly. A short railroad in southwestern Pennsylvania was laid in the middle sixties with iron rails of light weight. A rail's life in those days rarely exceeded five years, yet some of those light rails were in excellent condition almost fifteen years afterward, though they had carried a heavy coke traffic for several years. But this process was uncertain, and the best puddlers could never tell when to stop the process in order to obtain the desired grade.

When a modification of this refining process was attempted on a grand scale, almost contemporaneously by Martien in this country and Bessemer in England, the same uncertainty of product was encountered; sometimes the process was checked too soon, at others pushed too far. Here the inventor came to a halt. He could use only what was known and endeavor to improve methods of application. Under such conditions the Bessemer process was apparently a hopeless failure. Another, however, utilized the hitherto ignored work of the closet investigator. The influence of manganese in counteracting the effects of certain injurious substances and its relation to carbon when present in pig iron, were understood as matters of scientific interest. Mushet recognized the bearing of these facts and used them in changing the process. His method proved successful; but, with thorough scientific forgetfulness of the main chance, he neglected to pay some petty fees at the Patent Office, and so reaped neither profit nor popular glory for his work.

The Mushet process having proved the possibility of immediate and certain conversion, the genius of the inventor found full scope. The change in form and size of the converter, the removable base, the use of trunnions and other details, largely due to the American Holley, so increased the output and reduced the cost that Bessemer steel soon displaced iron, and the world passed from the age of iron into the age of steel.

Architectural methods have been revolutionized. Buildings ten stories high are commonplace; those of twenty no longer excite comment, and one of thirty arouses no more than a passing pleasantries respecting possibilities at the top. Such buildings were almost impossible a score of years ago, and the weight made the cost prohibitive. The increased use of steel in construction seems likely to preserve our forests from disappearance.

In other directions the gain through this process has been more important. The costly, short-lived iron rail has disappeared and the durable steel rail has taken its place. Under the moderate conditions of twenty-five years ago, iron rails rarely lasted for more than five years; in addition, the metal was soft, the limit of load

was reached quickly, and freight rates, though high, were none too profitable.

But all changed with the advent of steel rails as made by the American process. Applications of abstruse laws, discovered by men unknown to popular fame, enabled inventors to improve methods and to cheapen manufacture until the first cost of steel rails was less than that of iron. The durability of the new rails and their resistance to load justified increased expenditure in other directions to secure permanently good conditions of the roadbed. Just here our fellow member, Mr. P. H. Dudley, made his contribution, whose importance can hardly be overestimated. With his ingenious recording apparatus, it is easy to discover defects in the roadway and to ascertain their nature, thus making it possible to devise means for their correction and for preventing their recurrence. The information obtained by use of this apparatus has led him to change the shape and weight of rails, to modify the type of joints and the methods of ballasting, so that now a roadbed should remain in good condition and even improve during years of hard use.

But the advantages have not inured wholly to the railroad companies. It is true that the cost of maintenance has been reduced greatly; that locomotives have been made heavier and more powerful; that freight cars carry three or four times as much as they did twenty-five years ago, so that the whole cost of operation is very much less than formerly. But where the carrier has gained one dollar the consumer and shipper have gained hundreds of dollars. Grain and flour can be brought from Chicago to the seaboard as cheaply by rail as by water. The farmer in Dakota raises wheat for shipment to Europe. Coal mined in West Virginia can be sold on the docks of New York at a profit for less than half the freight of twenty-five years ago. Our internal commercial relations have been changed, and the revolution is still incomplete. The influence of the Holley-Mushet-Bessemer process upon civilization is hardly inferior to that of the electric telegraph.

Sixty years ago an obscure German chemist obtained an oily liquid from coal tar oil, which gave a beautiful tint with calcium chloride. Five years later another separated a similar liquid from a derivative of coal tar oil. Still later Hofmann, then a student in Liebig's laboratory, investigated these substances and proved their identity with an oil obtained long before by Zinin from indigo, and applied to them all Zinin's term, anilin. The substance was curiously interesting, and Hofmann worked out its reactions, discovering that with many materials it gives brilliant colors. The practical application of these discoveries was not long delayed, for Perkins made it in 1856. The marvelous dyes, beginning with magenta and safforino, have become familiar to all. The anilin colors, especially the reds, greens and blues, are among the most beautiful known. They have given rise to new industries and have expanded old ones. Their usefulness led to deeper studies of coal tar products, to which is due the discovery of such substances as antipyrin, phenacetin, ichthyol and saccharin, which have proved so important in medicine.

One is tempted to dwell for a little upon meteorology, that borderland where physics, chemistry and geology meet, and to speak of the signal service system, the outgrowth of the studies of an obscure school teacher in Philadelphia, but the danger of trespassing too far upon your endurance makes proper only this passing reference.

While men of wealth and leisure wasted their energies in literary and philosophical discussions respecting the nature and origin of things, William Smith, earning a living as a land surveyor, plodded over England, anxious only to learn, in no haste to explain. His work was done honestly and slowly; when finished as far as possible with his means, it had been done so well that its publication checked theorizing and brought men back to study. His geological map of England was the basis upon which the British survey began to prepare the detailed sheets showing Britain's mineral resources.

In our country Vanuxem and Morton early studied the New Jersey Cretaceous and Eocene, containing vast beds of marl. Scientific interest was aroused and eventually a geological survey of the State was ordered by the legislature. The appropriation was insignificant, and many of the legislators voted for it, hoping that some economic

discovery might be made to justify their course in squandering the people's money. Yet there were lingering doubts in their minds, and some found more than lingering doubts in the minds of their constituents. But when the marls were proved to contain materials which the chemist Liebig had shown to be all-important for plants, the conditions were changed and criticism ceased. The dismal sands of eastern New Jersey, affording only a scanty living for pines and grasses, were converted by the application of the marl, into gardens of unsurpassed fertility.

Vanuxem's study of the stratigraphy and Morton's study of the fossils had made clear the distribution of the marls, and the survey scattered the information broadcast.

Morton and Conrad, with others scarcely less devoted, labored in season and out of season to systematize the study of fossil animals. There were not wanting educated men who wondered why students of such undoubted ability wasted themselves in trifling employment, instead of doing something worthy of themselves, so as to acquire money and fame. Much nearer to our own time there were wise legislators who questioned the wisdom of "wasting money on pictures of clams and salamanders," though the same men appreciated the geologist who could tell them the depth of a coal bed below the surface.

But the lead diggers of Illinois and Iowa long ago learned the use of paleontology, for the "lead fossil" was their guide in prospecting. The importance and practical application of this science, so largely the outgrowth of unappreciated toil in this country as well as in Europe, is best told in Prof. Hall's reply to a patronizing politician's query:

"And what are your old fossils good for?"

"For this—take me blindfolded in a balloon; drop me where you will, if I can find some fossils, I'll tell you in ten minutes for what minerals you may look and for what minerals you need not look."

Many regard botany as a pleasing study, well fitted for women and dilettanti, but hardly deserving attention by strong men. Those who speak thus only exercise the prerogative of ignorance, which is to despise that which one is too old or too lazy to learn. The botanist's work is not complete when the carefully gathered specimen has been placed in the herbarium with its proper label. That is but the beginning, for he seeks the relations of plants in all phases. In seeking these he discovers facts which often prove to be of cardinal importance. The rust which destroys wheat in the last stage of ripening, the disgusting fungus which blasts Indian corn, the poisonous ergot in rye, the blight of the pear and other fruits, fall as much within the botanist's study as do the flowers in the garden or the sequoias of the Sierra. Not a few of the plant diseases which have threatened famine or disaster have been studied by botanists unknown to the world, whose explanations have led to palliation or cure.

The ichthyologist, studying the habits of fishes, discovered characteristics which promptly commended themselves to men of practical bent. The important industry of artificial fertilization and the transportation of fish eggs, which has enabled man to restock exhausted localities and to stock new ones, is but the outgrowth of closet studies which have shown how to utilize Nature's superabundant supply.

The entomologist has always been an interesting phenomenon to a large part of our population. Insects of beauty are attractive, those of large size are curious, while many of the minute forms are efficient in gaining attention. But that men should devote their lives to the study of the unattractive forms is to many a riddle. Yet entomology yields to no branch of science in the importance of its economic bearings. The study of the life habits of insects, their development, their food, their enemies, a study involving such minute detail as to shut men off from many of the pleasures of life and to convert them into typical students, has come to be so fraught with relations to the public weal that the State Entomologist's man has more anxious letters than that of any other officer.

Insects are no longer regarded as visitations from an angry deity, to be borne in silence and with penitential awe. The intimate study of individual groups has taught

in many cases how to antagonize them. The scaw threatening to destroy orange culture in California; the Colorado beetle seemed likely to ruin one of our important food crops; minute aphides terrified raisers of fruit and cane in the Sandwich Islands. But the scab is no longer a frightful burden in California; the potato bug is now only an annoyance, and the introduction of lady birds swept aphides from the Sandwich Islands. The gypsy moth, believed for more than a hundred years to be a special judgment, is no longer thought of as more than a very expensive nuisance. The curculio, the locust, the weevil, the cinch bug and others have been subjected to detailed investigation. In almost all cases methods have been devised whereby the ravages have been diminished. Even the borers, which endangered some of the most important timber species, are now understood, and the possibility of their extermination has been changed into probability.

Having begun with the "infinitely great," we may close this summary with a reference to the "infinitely small." The study of fermentation processes was attractive to chemists and naturalists, each claiming ownership of the agencies. Pasteur, with a patience almost incredible, revised the work of his predecessors and supplemented it with original investigations, proving that a very great part of the changes in organic substances exposed to the atmosphere are due primarily to the influence of low animals or plants whose germs exist in the atmosphere.

One may doubt whether Pasteur had any conception of the possibilities hidden in his determination of the matters at issue. The canning of meats and vegetables is no longer attended with uncertainty, and scurvy is no longer the bane of explorers; pork, which has supplied material for the building of railroads, the digging of canals, the construction of ships, can be eaten without fear. Flavorless butter can be rendered delicious by the introduction of the proper bacteria; sterilized milk saves the lives of many children; some of the most destructive plagues are understood and the antidotes are prepared by the culture of antagonistic germs; antiseptic treatment has robbed surgery of half its terrors, and has rendered almost commonplace operations which, less than two decades ago, were regarded as justifiable only as a last resort. The practice of medicine has been advanced by outgrowths of Pasteur's work almost as much as it was by Liebig's chemical investigations more than half a century ago.

In this review the familiar has been chosen for illustration in preference to the wonderful, that your attention might not be diverted from the main issue, that the foundation of industrial advance was laid by workers in pure science, for the most part ignorant of utility and caring little about it. There is here no disparagement of the inventor; without his perception of the practical and his powers of combination the world would have reaped little benefit from the student's researches. But the investigator takes the first step and makes the inventor possible. Thereafter the inventor's work aids the investigator in making new discoveries to be utilized in their turn.

Investigation, as such, rarely receives proper recognition. It is usually regarded as quite a secondary affair, in which scientific men find their recreation. If a geologist spends his summer vacation in an effort to solve some perplexing structural problem, he finds, on his return, congratulations because of his glorious outing; the astronomer, the physicist and the chemist are all objects of semi-envious regard, because they are able to spend their leisure hours in congenial amusements; while the naturalist, enduring all kinds of privation, is not looked upon as a laborer, because of the physical enjoyment which most good people think his work must bring.

It is true that investigation, properly so called, is made secondary, but this is because of necessity. Scientific men in government service are hampered constantly by the demand for immediately useful results. Detailed investigation is interrupted because matters apparently more important must be considered. The conditions are even more unfavorable in most of our colleges and none too favorable in our greater universities. The "literary leisure" supposed to belong to college professors does not fall to the lot of teachers of science, and very little of it can be discovered by college instructors in any department. The intense competition among our institutions requires that professors be magnetic teachers, thorough

scholars, active in social work, and given to frequent publication, that, being prominent, they may be living advertisements of the institution. How much time, opportunity or energy remains for patient investigation some may be able to imagine.

The misconception respecting the relative importance of investigation is increased by the failure of even well educated men to appreciate the changed conditions in science. The ordinary notion of scientific ability is expressed in the popular saying that a competent surgeon can saw a bone with a butcher knife and carve muscle with a hand-saw. Once, indeed, the physicist needed little aside from a spirit lamp, test tubes and some platinum wire or foil; low power microscopes, small reflecting telescopes, rude balances and home-made apparatus certainly did wonderful service in their day; there was a time when the finder of a mineral or fossil felt justified in regarding it as new and in describing it as such; when a psychologist needed only his own great self as a basis for broad conclusions respecting all mankind. All of that belonged to the infancy of science, when little was known and any observation was liable to be a discovery; when a Humboldt, an Arago or an Agassiz was possible. But all is changed; workers are multiplied in every land; study in every direction is specialized; men have ceased the mere gathering of facts and have turned to the determination of relations. Long years of preparation are needed to fit one to begin investigation; familiarity with several languages is demanded; great libraries are necessary for constant reference, and costly apparatus is essential even for preliminary examination. Where tens of dollars once supplied the equipment in any branch of science, hundreds, yes thousands, of dollars are required now.

Failure to appreciate the changed conditions induces neglect to render proper assistance. As matters now stand, even the wealthiest of our educational institutions cannot be expected to carry the whole burden, for endowments are insufficient to meet the too rapidly increasing demand for wider range of instruction. It is unjust to expect that men, weighted more and more by the duties of science teaching, involving, too often, much physical labor from which teachers of other subjects are happily free, should conduct investigations at their own expense and in hours devoted by others to relaxation. Even were the pecuniary cost comparatively small, to impose that would be unjust, for, with few exceptions, the results are given to the world without compensation. Scientific men are accustomed to regard patents much as regular physicians regard advertising.

America owes much to closet students as well as to educated inventors who have been trained in scientific modes of thought. The extraordinary development of our material resources—our manufacturing, mining and transporting interests—shows that the strengthening of our educational institutions on the scientific side brings actual profit to the community. But most of this strengthening is due primarily to unremunerated toil of men dependent on the meager salary of college instructors or government officials in subordinate positions. Their aptitude to fit others for usefulness, coming only from long trainings, was acquired in hours stolen from sleep or from time needed for recuperation. But the labors of such men have been so fruitful in results that we can no longer depend on the surplus energy of scientific men, unless we consent to remain stationary. If the rising generation is to make the most of our country's opportunities, it must be educated by men who are not compelled to acquire aptness at the cost of vitality. The proper relation of teaching labor to investigation labor should be recognized, and investigation, rather than social, religious or political activity, should be a part of the duty assigned to college instructors.

Our universities and scientific societies ought to have endowments specially for aid in research. The fruits of investigations due to Smithsonian's bequest have multiplied his estate hundred of times over to the world's advantage. He said well that his name would be remembered long after the names and memory of the Percy and Northumberland families had passed away.

Hodgson's bequest to the Smithsonian is still too recent to have borne much fruit, but men already wonder at the fruitfulness of a field supposed to be well explored. Nobel knew how to apply the results of science; utilizing the chemist's results, he applied nitro-glycerine to in-

dustrial uses; similarly he developed the petroleum industry of Russia, and, like that of our American petroleum manufacturers, his influence was felt in many other industries of his own land and of the Continent. At his death he bequeathed millions of dollars to the Swedish Academy of Sciences, that the income might be expended in encouraging pure research. Smithsonian, Hodgson and Nobel have marked out a path which should be crowded with Americans.

The endowment of research is demanded now as never before. The development of technical education, the intellectual training of men to fit them for positions formerly held by mere tyros, have changed the material conditions in America. The surveyor has disappeared—none but a civil engineer is trusted to lay out even town lots; the founder at an iron furnace is no longer merely a graduate of the casting house—he must be a graduate in metallurgy; the manufacturer of paints cannot intrust his factory to any but a chemist of recognized standing; no graduate from the pick is placed in charge of mines—a mining engineer alone can gain confidence; and so everywhere. With the will to utilize the results of science there has come an intensity of competition in which victory belongs only to the best equipped. The profit awaiting successful inventors is greater than ever and the anxious readiness to apply scientific discoveries is shown by the daily records. The Roentgen rays were seized at once and efforts made to find profitable application; the properties of Zirconia and other earths interested inventors as soon as they were announced; the possibility of telegraphing without wires incited inventors everywhere as soon as the principle was discovered.

Nature's secrets are still unknown and the field for investigation is as broad as ever. We are only on the threshold of discovery, and the coming century will disclose wonders far beyond any yet disclosed. The atmosphere, studied by hundreds of chemists and physicists for a full century, proved for Rayleigh and Ramsay an unexplored field within this decade. We know nothing yet. We have gathered a few large pebbles from the shore, but the mass of sands is yet to be explored.

And now the moral has been drawn. The pointing is simple. If America, which, more than other nations, has profited by science, is to retain her place, Americans must encourage, even urge, research; must strengthen her scientific societies and her universities, that under the new and more complicated conditions her scientific men and her inventors may place and keep her in the front rank of nations.

EXTRACTION OF IODINE FROM SEAWEED.—The following patented process is reported in Chem. Ztg.: The weeds are treated in the wet or dried state in such a manner as to dissolve the iodine and leave the residue in as nearly as possible its natural condition, to permit of its use as fertilizer. The iodine is dissolved by softening the weeds with seawater, which is freed from magnesia and rendered alkaline with caustic lime, and washing them with three separate portions, the second and third washings being reserved for treating a new portion of weeds. Slimy organic matter is removed by precipitation with ferrous sulphate or quicklime. Sulphuric or hydrochloric acid is added to the clear solution and the iodine liberated with nitric acid, ammonium persulphate or ferric salts. The iodine is then separated by addition of petroleum and stirring. On treatment with a solution of caustic alkali, the iodine is removed from the petroleum as alkali iodides and iodates. From these the iodine is obtained by precipitation, by means of potassium chlorate and hydrochloric acid. When dried weeds are used, a greater quantity of water is required, while quicklime and not ferrous sulphate is used for removing organic matter. In this case hydrochloric and fuming nitric acids are employed in the liberation of iodine. (Ap. Ztg.)

SALICIN IN TREATMENT OF SKIN DISEASES.—Crocker employs salicin in doses of 3 to 6 Gm. daily (45 to 90 grains) for the treatment of skin diseases in place of arsenic with good results. The preparation is usually borne well and eruptions are caused only in exceptional cases. The author attributes the action of salicin to its antibacterial properties, particularly in case of skin affections due to micro-organisms. (Ap. Ztg.)

DRUGS, DRUGGISTS AND LITERATURE.

By FRANCIS B. HAYS.

Like all literary men since the time of the immortalization of Romeo, who are called upon to write or say anything to pharmacists, Mr. Keller remembered an apothecary who dwelt hercabouts, with the beggarly account of empty boxes, upon whose back hangs ragged misery, etc.—From an account of a commencement address.

Yes, they never will forget that poor old apothecary! Perhaps it is because Shakespeare's lines about him are the most circumstantial description of a druggist and his little "shop" to be found in literature. Such being the case, it is all the more pity that it is so far from being a flattering one.

Shakespeare's exact language, and here I go, committing the very offence which it was my intention to criticize, is as follows:

Let's see for means; O, mischief, thou art swift
To enter in the thoughts of desperate men!
I do remember an apothecary,
And hercabouts he dwells—which late I noted
In tatter'd weeds, with overwhelming brows,
Culling of simples; meagre were his looks,
Sharp misery had worn him to the bones;
And in his needy shop a tortoise hung,
An alligator stuff'd, and other skins
Of ill-shaped fishes; and about his shelves
A beggarly account of empty boxes,
Green earthen pots, bladders and musty seeds,
Remnants of packthread and old cakes of roses,
Were thinly scatter'd, to make up a show.
Noting this penury, to myself I said,
And if a man did need a poison now,
Whose sale is present death in Mantua,
Here lives a catfif wretch would sell it him.
O, this same thought that but for my need;
And this same needy man must sell it me.
As I remember, this should be the house.
Being holiday, the beggar's shop is shut.
What, ho! apothecary!

Yielding to the gold and importunities of the desperate lover, the old apothecary exclaims: "My poverty, but not my will consents," and not even his poverty consented until Romeo, driven to demagoguery by desperation at the old man's refusal to serve him, exclaimed:

The world is not thy friend nor the world's law;
The world affords no law to make thee rich.

It might be doing the college-of-pharmacy-commencement orators a good turn, and certainly it would be affording their auditors a variety, if their attention were called to other texts from Shakespeare and like good sources, worthy of their cloquence. Without leaving the play which furnishes the lines just referred to or quoted from, we find Friar Laurence saying:

Within the infant rind of this small flower
Poison hath residence, and medicine power:
For this, being smelt, with that part cheers each part;
Being tasted, slays all senses with the heart.
Two such opposed kings encamp them still
In man as well as herbs, grace and rude will.

Iago, in Othello, seems to have known more about pharmacy than the Venetians of his day did about opium, for he exclaims:

Not poppy, nor mandragora,
Nor all the drowsy sirups of the world,
Shall ever medicine thee to that sweet sleep.

The Earl of Northumberland, in the second part of King Henry IV., being ill, and hearing of the approach of the enemy, exclaimed: "In poison there is physic," and at once began to prepare for combat. Perhaps they had no curare in Denmark in Hamlet's time, but that there was a good substitute, or else Shakespeare took liberties with the time and place (as he not infrequently did), is witnessed by the words of Laertes:

I'll anoint my sword.
I bought an unction of a money-bank
So mortal that, but dip a knife in it,
Where it draws blood, no cataplasm so rare,
Collected from all simples that have virtue
Under the moon, can save the thing from death
That is but scratch'd withal.

But the king, fearing lest the unction be not so poisonous as Laertes thought, or else that the sword of the latter might not prick Hamlet, prepared for the Prince "a chalice for the nonce," a sip from which would put him out of the way.

In "Timon of Athens" we read of antidotes which are poison and kill many; while one of "The Two Gentlemen of Verona" gave to the other, when sick, bitter pills. the other thinking it but fair to turn about when he was well, and the party of the first part ill.

Macbeth, finding that his physician could "not minister to a mind diseased," exclaimed in his anguish: "Throw physic to the dogs." So Beaumont and Fletcher, in their "Philaster," speak of

Nature too unkind,
That made no medicine for a troubled mind.

Following the example of Shakespeare, Pope lets the apothecary into literature in a shape not calculated to reflect any credit upon our honorable calling.

In his "Essay on Criticism," he says that as some men failed at courting the muse, they learned what they could of their more successful brethren, and then launched out boldly as critics of other men's poetry. He had felt the jealous sting of these fellows, who, being unable to produce good poetry themselves, sought to belittle the productions of others, for he writes:

Against the poets their own arms they turn'd,
Sure to hate most to whom from whom they learn'd.
So modern 'pothecaries, taught the art
By doctor's bills to play the doctor's part,
Bold in the practice of mistaken rules,
Prescribe, apply, and call their masters fools.

"A little learning is a dangerous thing," quite properly comes from the author of these lines, who in another place—and who knows, but he had the dispensing physician in his mind at the time?—says:

One science only will one genius fit,
So vast is art, so narrow human wit.

In fact, despite the slur above quoted, there is a lot of good sense in Pope's Essays—good for pharmacists as well as for others—Many lines from them, the origin of which some of us have lost sight of, being frequently heard in daily conversation. Here we are told to

Be not the first by whom the new are tried,
Nor yet the last to lay the old aside.

"To err is human, to forgive, divine," is another sensible bit clipped from them, as is also, "For fools rush in where angels fear to tread." For it was Pope, too, who bade us "Learn from the brook the physic of the field," and propounded the oft-repeated and still unanswered query:

Who shall decide when doctors disagree,
And soundest casuists doubt, like you and me?

This passage, however, does not refer to doctors of medicine, although it is usually applied to them by those who try to quote it.

Evidently the druggist did not take a very high rank in England about this time, at least according to the literary men's way of thinking, for we find Addison (who shared with Pope the distinction of being the foremost literary man of his time, and who was his friend until the genius of the younger man overshadowed him), delivering himself of this sentiment:

Advertisements are of great use to the vulgar: first of all, as they are instruments of ambition. A man that is by no means big enough for the gazette, may easily creep into the advertisements, by which means we often see an apothecary in the same paper of news with a plenipotentiary, or a running footman with an ambassador.

Notice how he ranks them—apothecaries and footmen; plenipotentiaries and ambassadors.

This quotation is from a paper in "The Tatler," which paper is full of advertising hints for druggists, and contains many humorous allusions to attempts of the ad-writers of that day. One advertisement was referred to as being a jejune effort. It extolled the virtues of a certain lavender spirit; others called attention to carminative wind-expelling pills, and to a most remarkable tape worm known to one Michael Parrot. In fact, so rich is this paper, that notwithstanding its 188 years of age, come next September 14th, it well deserves space in the Advertising for Druggists department.

There is a homely saying to the effect that no matter how high a bird flies, it must come to the earth for its food; so Milton, that grand poet whose mind soared above the earth, above theology, even pierced the very empyrean itself, was not too ethereal to refer to the East Indian spice trade, mentioning in the grandest English epic two little Dutch islands by name, two islands which we are prosaically told export cloves and nutmegs. Hear him grandiloquently sing:

A fleet decay'd
Hangs in the clouds, by equinoctial winds,
Close sailing from Bengala, to the Isles
Of Ternate and Tidore, whence merchants bring
Their spicy drugs.

—A. D. 1709.

This is very fine poetry, but has more to do with the wholesale than the retail trade; so enough of it; and now for a quotation from the same poem which more concerns us, or did more concern us as we were in Milton's day:

By fire
Of sooty coal th' empiric alchymist
Can turn, or holds it possible to turn,
Metals of drossiest ore to perfect gold.
In his "Comus" this grand poet describes in most beautiful language

A certain shepherd lad,
Of small regard to see to, yet well skill'd
In every virtuous plant and healing herb,
That spreads her verdant leaf to the morning ray.
This same youth carried in his letter scrip simples
of a thousand names, and could tell their strange and
vigorous faculties:

Amongst the rest a small unsightly root,
But of divine effect he culled me out;
The leaf was darkish, and had prickles on it,
But in another country, as he said,
Bore a bright golden flower, but not in this soil:

He called it haemony, and gave it me,
And had me keep it as of sovereign use
'Gainst all incantments, mildew, blast or damp,
Or ghastly furies' apparition.

Sydney Smith described a state of affairs which was worse than the stamp tax and annual re-registration combined. He speaks of a dying Englishman, who, "pouring his medicine, which has paid seven per cent., flings himself back on his chintz bed, which has paid twenty-two per cent., and expires in the arms of an apothecary who has paid a license of a hundred pounds of the privilege of putting him to death."

In strong contrast to this dark picture, George Eliot gives us this one in her "Middlemarch," speaking of the young doctor Lydgate:

He carried to his studies in London, Edinburgh and Paris, the conviction that the medical profession as it might be was the finest in the world. . . . He intended to begin in his own case some particular reforms which were quite certain within his reach, and much less of a problem than the demonstrating of an anatomical conception. One of these reforms was to act stoutly on the strength of a recent legal decision, and simply prescribe, without dispensing drugs or taking percentage from druggists. This was an innovation for one who had chosen to adopt the style of a general practitioner in a country town, and would be felt as offensive criticism by his professional brethren.

The poet Matthew Prior, who lived some 200 years ago, took one good fall, as the saying goes, out of the physicians of his day, who, it seems, wrote no better hands than now, when he wrote:

You tell your doctor that y're ill;
And what does he but write a bill
Of which you need not read one letter;
The worse the scrawl, the dose the better,
For if you knew but what you take,
Though you recover, he must break.

The joker who said that he could cure his wife's cold "in a day" by promising to take her to the theatre at night, was antedated by Young, who said: "Must women have a doctor or a dance?"

In one of his political satires about some of the members of Parliament, Moore makes the vendor of a certain pill say:

Should symptoms of speaking break out on a dunce,
(Vat is often de case) it vill stop de disease
And pring away all de long speeches at vonce,
Dar else vould, like tapeworms, come by degrees.

The formula of the pill is not given, else it would be published here that some wholesale manufacturer might make up a lot and send to Washington.

When this century was much younger that it now is, a certain New York apothecary was intimately connected with a local literary sensation. This sensation was caused by the appearance in "The Evening Post during March, 1819, over the nom de plume "Croaker & Co.," of certain poems, the authorship of which was kept secret for some time. "These pieces related to persons, events and scenes with which most of the readers in New York were familiar, and as they were distinguished alike for playful humor and an easy and spirited diction, they became very popular, and many efforts were made to find out the authors." That not even their handwriting might be a clue to their identity, these authors, hardly more than lads, carried their manuscripts to a friend who copied them and sent them to the Post. This friend was Dr. William Langstaff, who kept a drug store at No. 390

Broadway. The names of the the authors now take a high place in the roll of American poetry, and are Joseph Rodman Drake and Fitz-Greene Halleck.

The chronicler tells us that Langstaff and Drake studied medicine together under Dr. Romaine (or Romaine). Dr. Langstaff did not prove a success as a physician, so Henry Eckford, the shipbuilder, and father-in-law of Drake, set him up in the drug business. Mr. Eckford also furnished him means to accompany Dr. and Mrs. Drake in their tour of Europe in 1818. Langstaff is described as an eccentric apothecary and accomplished mineralogist.

And now to take a long jump backward and quit: Plutarch, in his life of Alexander, relates a very dramatic incident in which a physician-apothecary took a leading part. The King was sick, and his physicians were afraid to minister unto him. But Philip, the Acarnanian, saw that something must be done, and so prepared to potion. While he was so engaged a letter was handed to the sick King telling him that Philip had been bribed to poison him. Philip soon came in with his cup of physic. Alexander took it and handed him the letter. One drank, one read, each casting glances at the other the while. Philip proved as good a physician as he was an honest man, for Alexander's confidence in him was rewarded by recovery.

Cato, this same biographer tells, thought little of those who professed to have peculiar skill in the making and administering of medicines. He advised his son to have nothing to do with such, and added that he himself had written a little treatise, in which he had set down his method of cure, and the regimen he prescribed when any of his family fell sick; that he never recommended fasting, but allowed them herbs, with duck, pigeon or hare, such kind of diet being light and suitable for sick people, having no other inconvenience but its making them dream; and that with these remedies and this regimen he preserved himself and his family. The biographer adds with a certain grimness: "But his self-sufficiency in this respect went not unpunished, for he lost both his wife and his son." (Druggists Circular.)

NEW-OLD METHODS IN MEDICINE.

Some of the very latest ideas in medicine are nothing but scientific adaptations of old popular methods, long discredited, so we are told by M. Henri de Parville (La Correspondent, Paris, May 10; Trans. for Literary Digest). Says M. de Parville:

"Popular traditions rarely fail to contain a modicum of truth. Once on a time, not so very long ago, people used to smile contemptuously at old rural medical customs, whose meaning was not thoroughly understood—singular medicines, mixtures of the powdered organs of animals, bits of liver, biliary vesicles, venous, etc. We were wrong, for the most recent discoveries are tending to show that these medicines, which seem to be so strange, ought really to possess powerful curative virtues. It is certain, at any rate, that science is throwing sudden light on some facts that have been little studied—contested facts, which, nevertheless, may be quite true. So, recently, M. Phisalix has called our attention to a discovery that enlarges our horizon in a singular manner. Since the immortal work of Pasteur, scientists have been seeking for vaccines against contagious disease, by investigating the immunizing substances engendered by the microbes of those diseases in the organism. Finally, they have been able to vaccinate against venoms, by diminishing the virulence of the bites of venomous serpents. But now M. Phisalix has obtained in the laboratory of the museum, for the first time, a chemical vaccine against the poison of the viper. He has found in the bile of the serpent a well-known substance, 'cholesterin,' which exerts a marked immunizing action against the snake's venom. First it was objected that this chemical substance might not be pure, and might contain traces of some immunizing toxin. But, as he repeated his experiments with cholesterolin found elsewhere than in the bile. These cholesterolins at once proved to be immunizing."

The writer goes on to say that M. Phisalix has also found certain vegetable extracts, such as "tyrosin" (found in the dahlia and in some mushrooms) to be immunizing, and reminds us that both vegetable substances and bile have long been used in India, the south of France, and elsewhere, as popular remedies for snake bite. Thus popular tradition has been justified by the latest scientific results. As a second instance of the efficacy of popular remedies, the writer mentions the treatment of disease by the administration of healthy animal parts corresponding

to the affected organ, which has been called by such names as "organo-therapy," "histotherapy," and "zootherapy." This, he reminds us, is only about a dozen years old as a scientific practice, yet in popular medicine it is prehistoric. Says M. de Parville:

"The savages, when they had killed a valorous enemy, ate his heart to get his courage; the warriors and hunters ate the bull's flesh to give them coolness and bravery. Did not the heroism of Achilles come in part, according to legend, from his having been nourished on the marrow of the lion and the tiger? And is it not curious that we and in Africa a general belief of a similar character regarding the marrow of leopards? In some countries mothers cause their children to eat the brains of animals to increase their intelligence. Even leaving out of account the exaggerations of ignorance and fanaticism, it remains certain that in Europe for a long time the physicians of the greatest eminence shared the faith of the common people in the efficiency of animal juices and secretions. Then there was a reaction, and, from the eighteenth century to our own day, preparations of animal tissues lost almost all credit. Nevertheless, a counter-reaction set in when they began to give to invalids ferments such as diastase, pepsin, pancreatin, etc., and also cod liver oil.

"In July, 1891, Brown-Sequard and d'Arsonval concluded that the morbid symptoms that depend in man on the internal secretion of an organ should be treated by injections of an extract of the liquids taken from the same organ in a healthy animal. And as the juices of the organs, while they contain useful principles, contain also toxic substances, that might cause serious consequences, we must employ only liquids that have been sterilized and well filtered under pressure in carbonic acid. In short, we must prepare organic medicines. "Ophotherapeutics" has been called in France) was first practised by the injection of the juices into the veins. Now, generally, physicians are satisfied with administering them through the digestive organs."

After summarizing what has already been done in this branch of medicine, especially in disease due to imperfect action of glands, such as the thyroid gland, the kidneys, and the liver, M. de Parville sums up its results as follows:

"We see that there is more promise for the future than there are positive results in the past. But, on the other hand, the method has shown itself so powerful and so rapid that we can well understand the enthusiasm with which many experimenters and clinicians have hailed it. We must, then, conclude that it is well to encourage further research, classify our results, and await patiently until statistics have informed us more completely regarding the true practical value of the new method."

EXAMINATION QUESTIONS.

OREGON STATE BOARD OF PHARMACY.

PHARMACY.—JUNIOR.

1. What systems of weights are used in a drug store which is official.
2. Give the different tables of weights.
3. Give the equivalents of one pound avoirdupois; one of troy; one grain; one fluid ounce in metric weights. How many fluid ounces in a litre? How many ounces avoirdupois in a kilogramme? What is weight of one cubic centimetre water at 4° Fahrenheit?
4. Define specific gravity. How would you ascertain specific gravity of a liquid? Of a solid heavier than water? Of one lighter than water? Why is temperature an important consideration in taking specific gravity?
5. Describe the Fahrenheit and Centigrade thermometers. How is zero Centigrade found? At what temperature Centigrade does water boil? Give freezing and boiling points on each scale. How would you convert Centigrade into Fahrenheit? How would you convert Fahrenheit into Centigrade?
6. Distinguish between evaporation, distillation, and sublimation. What controls the rate of evaporation? Why is it sometimes conducted in vacuo? Define fractional distillation; destructive distillation. What are products of sublimation called? Mention several products made by this process.
7. Explain the terms efflorescence, deliquescence, exsiccation, commutation, levigation, elutriation.
8. What properties should a perfect pill mass possess? What is an excellent vehicle? Mention several. What ingredients of Compound Cathartic Pills, Pill Aloes, Pill Ferri Carbonate.
9. What is a tincture? Mention three ways of making them. Give ingredients of Tincture Gentian Compound, Tincture Opil Camphor.
10. How much Opium is there in one pint Laudanum? How much Arsenous Acid in one pint Fowler's Solution? How much Tartar Emetic in one pint Wine Antimony?

TOXICOLOGY.—JUNIOR.

1. If ten minims of Tinct. Opium were prescribed how many drops should be given? How many drops in ten minims of Tinct. Aconite?

2. What is the best general antidote for alkaloidal poisoning, and why?
3. Write formula for 4 oz. of 4% solution of Cocaine Hydrochlorate. Give dose, medical properties, and antidote.
4. What is Mercuric Chloride, medical properties, dose, and antidote for overdose? What relation does White Precipitate bear to it?
5. What are the symptoms of lead poisoning? Why is diluted Sulph. Acid a good antidote? Name a physiological antidote.
6. What is the official antidote for arsenical poisoning? How prepared?
7. In poisoning with phosphorus why should oils not be given? Is there an exception? If so, what?
8. In poisoning by the mineral acids why should emetics not be given? What treatment should be pursued?
9. Mention the Potassium Salts which are toxic; also the Sodium Salts.
10. Mercurous Chloride, Ferrous Sulphate, Zinc Oxide, Sodium Phosphate, Potassium Bichromate, F. E. Belladonna, Tinct. Opium Camph., Croton Oil, Sulphuric Ether, and Per Oxide Hydrogen. Which should be dispensed under a poison label?

MATERIA MEDICA.—JUNIOR.

1. Give the official name of two Chlorides, two Iodides, and two Oxides of Mercury.
2. Name five (5) official plants indigenous in Oregon.
3. In what respect do essential oils differ from fatty oils.
4. Name five (5) Antipyretics.
5. What is the source from which the following are obtained: Salicin, Santonin, Tannin, Naphtha?
6. Belladonna: Give its active principle and dose.
7. What is Catechu? From what is it obtained?
8. State the difference between Carbo Ligni and Carbo Animalis.
9. What is Gun Cotton? Collodion? Flexible Collodion?
10. Adeps Lanæ Hydrosus: What is its nature, source, and characteristics?

CHEMISTRY.—JUNIOR.

1. What is an atom? A molecule?
2. Explain what is meant by an acid. A salt. A base.
3. Give the official title of Aqua Regia, and how it is made? Why so called?
4. What are the elementary constituents of air and water?
5. What is the difference between an acid and an alkali? What relation do they bear to each other?
6. Denote the meaning of the words hypo, proto, and pyro as prefixes in chemical nomenclature. Give one example each of a chemical having the prefix hypo, proto, and pyro.
7. The following names are used in prescriptions to designate Calomel and Corrosive Sublimate. Specify in each case which is Calomel and which is Corrosive Sublimate: Hydrargyri Chloridum, Hydrargyri Per Chloridum, Hydrargyri Sub Chloridum, Hydrargyri Chloridum Nit, Hydrargyri Chloridum Corrosivum, Hydrargyri Bi-Chloridum. Explain the difference between a mercurous and a mercuric compound.
8. What is H₂O₂ and for what purpose used?
9. What Ammoniacal Salts are contained in Spiritus Ammonie Aromaticus, U. S. P.
10. Write the symbols: Lead, Antimony, Iron, Magnesium, and Sulphur?

PHARMACY.—SENIOR.

1. Give the official method of making Fluid Extracts. What is the official strength? Describe the process of reprecipitation. That Fluid Extracts contain Acetic Acid in the menstruum? What Fluid Extracts contain Ammonia? Give official process for making F. E. Nux Vomica.
2. Write out ingredients, quantities, and manipulation for making one pint of Elixation Compound.
3. Give the meaning of the following terms used in prescription writing: Bis in die, Capiat, A. C. P. C. (as. ad., Cochlear Parvum, Omni Nocte, Dentur tales doses, In doing a prescription what method would you pursue to insure accuracy and prevent mistakes?
4. How would you make three and one half ounces of 4% solution Cocaine. Give quantities.
5. Mention ingredients contained in Syr. Scillæ Co., Spts. Aetheris Co., Pulv. Glycyrrhizæ Co., Selditz Powder, Pils. Doveri, Pil Cathartica Co.
6. Give directions for making a tincture, an infusion, a decoction, an abstract, a solution, a rect.
7. What are ointments? What is the usual basis? How do they differ from cerates? Mention different methods of incorporating active ingredients. What properties should distinguish a perfect ointment? Give process for making Citrine Ointment. How much mercury is contained in Blue Ointment, and how is it made?
8. Define specific gravity. What is the specific gravity of Aether? Alcohol? Dilute Alcohol? Sulphuric Acid? Glycerine? Chloroform? Water? Urea?
9. Give the official names of Goulard's Extract; White Precipitate; White Vitrol; Red Precipitate; Tartar Emetic; Blue Stone.
10. What are the official methods of making syrups? Give the details of each method. How is simple syrup prepared? How much sugar does it contain? How is Syrup Iodide Iron prepared? Describe appearance of

finished product. How is Syrup Ipecac made? What are the ingredients of Syr. Sarsaparilla Co., and how prepared?

MATERIA MEDICA.—SENIOR.

1. Opium: What is its nature and source? Its physiological action? Mention its official preparations and their strength. What powerful emetic is made from Morphine, and what is its dose?
2. Erythroxylon: Give its source and important alkaloid. What effect does it have locally on the human system? In an overdose what are its principal antagonistics?
3. Asafetida: Give the source from which it is obtained. Name its official preparations, and give their doses.
4. What is Gum-resin? An Oleoresin?
5. Bromine: What is its nature and source? Its principal salts? What is the physiological action of the bromides?
6. Give the botanical name and habitat, with official title of each, of the following drugs: Bitter Orange Peel, Boeset, Juner Berries, Calabar Bean.
7. What is Arsenic? Give its source and some of the tests for it. Name two (2) of its preparations and doses.
8. What is the common name of Ferrocyanide of Potash? Of Ferricyanide of Potash?
9. What is Pepsin? How is it obtained? Give a test, and its official preparations.
10. Acetanilid: Give its source and characteristics. Its solubility and dose?

TOXICOLOGY.—SENIOR.

1. What is a chemical antidote? Name a chemical antidote for Corrosive Sublimate. In what manner does a chemical antidote perform its functions?
2. What is a physiological antidote? Name one for Strychnine. In what manner does a physiological antidote perform its functions?
3. Give maximum doses of Tartar Emetic, Strychnine, Corrosive Sublimate, Tr. Belladonna, Fowler's Solution, Carbolic Acid.
4. In the use of Common Salt as an antidote for Nitrate of Silver, what new compounds are formed? Why are they not toxic?
5. What is the toxic principle contained in Potassium Cyanide? From what vegetable substance may this principle be obtained?
6. From what is it obtained commercially? Its official title? Percentage strength? Dose? Antidote?
7. Name symptoms of poisoning by Tartar Emetic; dose; treatment if overdosed.
8. Symptoms: Thirst, epigastric pains, restlessness, great anxiety, vomiting, and in later stages, purging (excreted matter luminous in the dark). What poison is indicated, and treatment?
9. Symptoms: Widely dilated pupils, dryness of mouth and throat, relaxation of muscular system, falling pulse and respiration, and stupor or convulsions. What probable poison, and treatment?
10. Symptoms: Giddiness, drowsiness, slow, full pulse, clammy skin, contracted pupils, stertorous breathing. Probable poison, antidote, and treatment?

CHEMISTRY.—SENIOR

1. Define the terms anhydrous, hydrous, hydrate, and anhydride. What do you understand by water of crystallization?
2. Give two methods of preparing chlorine. What is Aqua Chlorine of the U. S. P.? Why does it change its color and reaction when exposed to light?
3. How is Phenol commercially and artificially prepared? How would you distinguish Carbolic Acid from Creosote?
4. What is a monad, dyad, triad.
5. What are the sources of Lactic Acid? How is Lactic Acid usually prepared? Name some of the plants in which Malic Acid is found?
6. What is the relation between salts whose specific names end in the syllable "ate", and the acids ending in "ic"?
7. What meanings are commonly assigned to the terms evaporation, carbonization, and incineration?
8. What is KCN? How and from what is it prepared?
9. Name the official salts of Mercury soluble in water.
10. What is understood by the polyvalence of atoms? Give examples of univalent, bivalent, trivalent, and quadrivalent atoms.

[These questions are here reprinted verbatim et literatim et punctuatim. The errors in grammar, careless phraseology, faulty spelling and inexcusable and perhaps dangerous abbreviation are noticeable. Ed. Era.]

PREPARATION OF ETCHING FLUID.—The essential constituent of etching fluids is ammonium fluoride: mix in a lead flask 30 parts of ammonium fluoride, 15 parts of distilled water and 6 parts of pure sulphuric acid, warm to 40° C.,—but not higher—and add after cooling 6 parts of strong hydrofluoric acid and 1 to 2 parts of gum arabic in solution. Close the flask with a well fitting lead stopper. For particularly delicate drawings the quantity of gum arabic should be increased. Steel pens or goose quills may be used. (Drog. Ztg.)

GERARDE AND THE GERARDIAS: THE HERBALIST AND HIS NAMESAKES.

BY MARTHA BOCKEE FLINT.

On shaded hillsides and in woodland glades there blooms through August, a stately plant, the most beautiful of a varied group which, as the genus *Gerardia*, perpetuates a name too little honored. Few men have done more for English botany than the "diligent and painful apothecary," John Gerarde, some time gardener to Cecil, Lord Burleigh. It is just three hundred years since, in December, 1597, was published the "Herball, or Generall Historie of Plantes Gathered by John Gerarde of London, Master in Chirurgie." The second edition thereof, the only copy known to be in the city of New York, is "very much enlarged and amended by Thomas Johnson, Citizen and Apothecary," and bears the imprint "London, printed by Adam Islip, Joice Norton and Richard Whtaker, anno 1633." On the frontispiece of the thick folio is Gerarde's title, given above, inscribed upon an oval supported by Corinthian columns, and bordered by six woodcuts. At the head of the page is represented the sun bursting through clouds, and on its disk is a triangle bearing a Hebrew legend; below are the words from Genesis: "Ecce dedi vobis omnes herbas semen tantes semen quæ sunt." In the upper corners are figures of Ceres and of Pomona, offering grains and fruits. At the left of the columns stands Theophrastus, a scroll in one hand, in the other flowers; at the right, Dioscorides holds an open book. Beneath the title is the portrait of Gerarde, supported on either side by vases heaped high with pyramidal masses of fruits and flowers. The face is the serious countenance of the sixteenth century; oval, with a pointed beard; a long, straight nose, well-arched eye-brows, and deep-set eyes, fixed, as if looking into the hidden mystery of life:

"Little flower, but if I could understand
What you are, root and all, and all in all,
I should know what God and man is."

It is a sad face, but with the serenity of a meditative mind. He wears the quilled ruff and the embroidered doublet of the period, and holds in his hand a spray—perhaps of wild rose. Here is not the exactness which marks Gerarde's own drawings.

The book is dedicated to "The right Honourable, his Singular good Lord and Master, Sir William Cecil," and is written from his "House at Holborn within the Suburbs of London, this first of December, 1597." Holborn—named from Old Bourne, a branch of the Fleet—was itself a rural region which then afforded a fair field for the collector. Years later, Sir Henry Wotton could say, "I know all the plants of my time, and have scarcely sampled farther than Cheapside." In Gerarde's day wild flowers grew all over London; the water violet was found at Lambeth; "a field at Southwark, back of the theatre," the Globe Theatre, was all abloom; wall rue grew on Westminster Abbey, and wall pennywort over "the door that leadeth from Chaucer's tomb to the old Palace," while bugloss mantled "the drie ditch banks in Pickedille." In "An Address to the well Affected Reader and Peruser of this Booke," he says, "Myselfe, one of the least among many, have presumed to seeke forth unto the view of the world, the first fruits of my owne Labours." But he was meanwhile "constrained to seeke after his living, being vould of friends to beare some parte of the burden." He further notes the difficulties which beset an honest searcher after truth, saying, "Let a man excell neuer so much in any excellent knowledge, neuer the les many times he is not so much regarded as a Iester, a Booster, a Quacksaluer, or Mountebank."

Gerarde was born at Nampitwich in Cheshire, in the year 1545. Thence he came early to London, and both as gardener in the lordly domains of Cecil and as an apothecary, he made wise use of the knowledge gained as "a painefull Herbalist" and "a curious searcher of simples." He studied surgery, and practiced to some extent in the empirical methods of the time, but his heart was centered in his garden at Holborn. There was his seminary, or "seed plot and nursery for young plants," as the word is defined in Bailey's Dictionary. There he collected the English flora, and established many foreign plants, studying their habits, their possible uses, and their adaptation to the climate of England. His diligence in searching out

new species was unwearied. Dayton alludes to his work as the limit of possible accomplishment:

"To those unnumbered sorts of simples here that grew.

Which justly to set down even Dodon short doth fall, Nor skillful Gerard yet shall ever find them all."

Botanists of to-day say that Gerard knew little of science, but it is worth while to consider what science was in the sixteenth century, when the glamour of alchemy and of astrology diffused a false light over every department of natural philosophy. Gerard died in 1607, just one hundred years before Linnæus was born, and a dozen years before the birth of John Ray, who laid the corner stone of the natural system and made the first formal catalogue of British plants. For a man then to have studied in any spirit of careful observation means much. His belittlers emphasize Gerard's ignorance of the classic writers on botany. He might be none the worse for that, but he quotes with discrimination from Theophrastus and Dioscorides, from Pliny and Galen, and from his contemporaries, Gesner and Fuchsius and Lonicerus. His classification was based on Dr. Priest's translation of Dodoneus, published in 1583, but in the details of arrangement he more closely followed Lobel.

His special excellence was in the careful enumeration of native plants, in the loving study of their properties, real or imagined, and in the vivid descriptions which, with his faithful drawings of English plants, make him an authority in cases of disputed nomenclature. Other cuts in the *Herball* are from the *Kreuterbuch* of Tabernaemontanus, published at Frankfurt in 1588, and used by Dodoneus, by Lobel, and by Clusius.

He delights also in the old English names of plants, and one reads of goldes and of paiges, of pawnee and of florumour, as on a page of Chaucer or of Spencer. Much of the best poetry of plant lore is found in the unconscious charm of his writing. Through it all runs the current of conscientious adherence to truth as he could best discover it. His most marvelous ascriptions of "virtue" to any plant, if not tested by himself, are qualified by "I have heard it reported." He denounces all "ridiculous tales, whether of old wives or some runnagate surgeons and physicke-mongers," and is slow to accept mere hearsay. With every plant he treats in a separate section "The Kindes," "The Description," "The Places," "The Names," "The Temperatures," and "The Vertues" of each. He mentions those which "doe grow in my Garden" with especial tenderness.

The American genus of the family Scrophulariaceæ which bears the name of Gerardia includes two groups of plants, related in structure, but very different in appearance. The false foxgloves are stout herbs, the various species from two to five feet in height. In some, the reddish stems are covered with the blue bloom of raspberry briars. In others, the glaucous growth is replaced by a delicate pubescence. The leaves, sinuate or pinnatifid, are thick and usually a bluish green, although in Gerardia pedicularia they are thin, pale green, and downy, and in the southern Gerardia pectinata they are decidedly hairy. The exquisite yellow of the flowers is the very tint of the butterflies, at their blooming, hovering in thousands over the country roads. The corollas are more open than those of the English foxglove, to which it has little resemblance, and the flaring flowers would furnish better hats than gloves for the little folk in green. Indeed, this etymology of the common name of the *Digitalis* may well be questioned. So careful a student of plant lore as Hildebrandt Friend says "fox" is not a corruption of "folk," but that the name was probably first fox-gleew—*g. cor.* equivalent to glee or music—its spire of bell-shaped flowers rising above the covert of fox and hare, suggesting the old tinninabulum, a chime of small bells fixed on an arched support.

The other group of Gerardias seldom exceeds a foot in height; the foliage is scant, often filiform, and the flowers are open bells of a purplish pink, very gay when blooming profusely on sandy barrens. The one group are the plants of rich woodlands, the other of thin, arid soil, of salt marshes, and of the seashore, but each one records the name of John Gerard as he would have best liked it to be preserved. Never within his loved garden at Holford, they are still a fitting memorial of him who so carefully studied their kindred, and

"Kydst the hidden Kindes of many a weede."

—Popular Science Monthly.

PHARMACY.

DI-AMIDO-DI-PHENYL-AMINE is a new hair dye, patented by Prof. Erdmann. (Ph. Post.)

OVARIGEN is an organo-therapeutic preparation obtained from the ovaries of calves or lambs. (Ph. Post.)

OL. CANNABIS IND. COCTUM is, according to "Jour. de Ph. Eis. Lothr.," a preparation used in Persia, prepared by boiling the fresh flower heads of Cannabis Indica in oil of sweet almonds or butter.

ANTISEPTIC LAMINARIA PENCILS are prepared by impregnation with a solution of 10 parts of iodoform in 100 parts of ether or with a one per cent. solution of corrosive sublimate in absolute alcohol or ether. (Ph. Post.)

ANTISCABIN is a secret remedy for the itch, which has been found to consist of balsam Peru, soap, glycerine, boric acid, alcohol and beta-naphthol. It is a soap-like mass, directed to be used externally 2 or 3 times daily. (Ph. Post.)

SAROTHAMUS SCOPARIUS IN ERYSIPELAS.—Testivin uses with success a dressing saturated with a decoction of this drug in the treatment of erysipelas. Decoctions of 10 to 15 per cent. strength are used. They are prepared by pouring boiling water over the drug and boiling for 10 minutes. After cooling, the solution is filtered. If it is to be kept some time, 5 per mille of salicylic acid may be added. The compresses are renewed once daily. (La Med. Mod.)

ARTIFICIAL IVORY.—Bones are cleaned and whitened by means of a bleaching agent and then treated with benzine to remove fat. After careful assorting they are converted into sawdust or thin shavings in suitable machines. They are again bleached and then boiled with a little water to dissolve a little gelatine. The mixture is pressed into forms, care being taken to vary the shades of color in such a manner as to give the product the grained appearance of natural ivory. By treatment with paraffin or wax the surface is rendered semi-transparent. (Drog. Zag.)

PURAL.—Heumann proposes a new disinfecting agent, which consists of powdered wood charcoal, saturated with a mixture of menthol, carbolic and benzoic acids, and compressed into cylindrical form. For use a cylinder is ignited with a candle flame and laid on a suitable surface to undergo slow combustion. Dr. Rosenthal tested the value of Pural and found that the odors of sickrooms are entirely removed by the use of 2 or 3 cylinders daily, and that only very sensitive persons are slightly annoyed by the vapors. It is claimed that this preparation is equal to vaporized phenol in the treatment of whooping cough. (Ph. Post.)

TFOL.—A mineral bearing this name is used by the Arabs instead of soap for washing their garments. This body has a wax-like appearance, is fatty to the touch, and varies in color according to the nature of metallic oxide which it contains, appearing red, gray or pure white. It is found throughout entire Algeria and, according to researches by Lahache, consists of alkali and alkaline earth silicates, calcium carbonate, fine gelatinous silica, alumina, alkali sulphates and chlorides. Since only a small proportion of the mineral is soluble in water, it is surmised that the cleansing effect is due principally to absorption. Lahache proposes the mineral as a vehicle for an antiseptic emulsion, and directs 20 parts of Tfol to be mixed with 100 parts of heavy tar-oil, the mineral being previously finely powdered and moistened with water. A stable, homogeneous paste is obtained, from which the oil does not separate even on admixture with water. (Ph. Post.)

PARAFFIN—XYLOL.—This is a solution of solid paraffin in 10 times its weight of xylol, recommended by Menge to surgeons, for covering the hands before operations with a thin layer of paraffin, after washing them with a weak solution of potash and then with alcohol. The paraffin does not in the least hinder the movements of the hands and may be readily removed with ether at the end of an operation. (Ph. Post.)

"MANUFACTURE" DEFINED.—In a recent case before the United States Supreme Court, that tribunal defined the term "manufacture" as follows: The primary meaning of the word "manufacture" is something made by hand, as distinguished from a natural growth; but as machinery has largely supplanted this primitive method, the word is now ordinarily used to denote an article upon the material of which labor has been expended to make the finished product. Ordinarily, the article so manufactured takes a different form, or, at least, subserves a different purpose from the original materials; and usually it is given a different name. Raw materials may be and often are subjected to successive processes of manufacture, each one of which is complete in itself, but several of which may be required to make the final product. * * * Thus, the steel spring of a watch is made ultimately from iron ore, but a large number of processes or transformations, each successive step in which is a distinct process of manufacture, and for which the article so manufactured receives a different name. The finished product of one manufacture may become the material of the next in rank.

NEW METHOD OF PREPARING THE QUININE HYDROCHLORIDES.—Vitali recommends the following: A concentrated aqueous solution of 100 parts of quinine sulphate and a solution of 17 parts of potassium chloride are mixed and evaporated on a waterbath to dryness. The residue is extracted with boiling alcohol. If the alcoholic solution should have a yellowish color, it can be decolorized with bone-black, and the residue, after evaporating the alcohol, represents the finished product, absolutely pure. The method is based on the following reaction: $(C_{20}H_{24}N_2O_2)_2H_2SO_4 + 2KCl = 2C_{20}H_{24}N_2O_2HCl + K_2SO_4$. If the bi-hydrochloride is desired, instead of the normal salt, the process is modified by using 100 parts of chemically pure quinine bisulphate and 25.4 parts of potassium chloride. The reaction then is as follows: $C_{20}H_{24}N_2O_2H_2SO_4 + 2KCl = C_{20}H_{24}N_2O_2HCl + K_2SO_4$. From the partially evaporated alcoholic solution the salt separates out in fine, large crystals. Both quinine salts are very pure and this method has the advantage that contamination with toxic barium salts, which may occur in using the ordinary method of double decomposition with barium chloride, is entirely avoided. Instead of potassium chloride pure sodium chloride may be used, 100 parts of normal quinine sulphate requiring 13.2 parts and 100 parts of bi-sulphate 24.35 parts. (Ph. Post.)

SHEET CELLULOID.—"Compounds of pyroxylin," as employed in paragraph 17 of the tariff of 1897, is a comprehensive term, as appears from the opinion rendered by General Appraiser Somerville, in a case where an importer of so-called "sheet celluloid" protested against the rate and amount of duties assessed by the collector at the port of importation. Generally, however, the term is applied to the solid form only, celluloid being one of these solid compounds. Collodion is a solution of pyroxylin, generally in alcohol or ether. Celluloid, rolled, is in the form of rough porous sheets, which are placed in molds or dies, and subjected to heavy hydraulic pressure, coming out in the form of thick blocks. These blocks are then placed in a machine similar to a veneer planing machine, which planes off unpolished sheets of celluloid of the desired thickness. These unpolished sheets are then dried or seasoned thoroughly, again placed in a hydraulic press, between two polished surfaces and after having been softened by heat, they are subjected to enormous pressure, whereby the softened surfaces are pressed against the polished metal surfaces, the celluloid taking its polish from them. The chief use of sheet celluloid is in making combs, but numberless articles may be made from it by further processes of manufacture.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Queries From Non-Subscribers Not Answered.

The attention of Louis Brill, Ohio City, O., and C. W. Ohning, Philadelphia, Pa., is called to the rules at the head of this department. Queries from non-subscribers are not answered.

Wilson's Methyl Vapor.

(J. L.) We have no information of this substance beyond that published in this journal, December 23, 1897, page 960.

Baume's Hydrometers and Specific Gravity.

(Medicus, N. O.) Table showing specific gravity corresponding with degrees of Baume's hydrometers may be found in a number of standard reference works. See U. S. Dispensatory, last edition, pages 1814 and 1815. Rules are also given for finding the corresponding degree of Baume, the specific gravity being known and the specific gravity corresponding with the several degrees of Baume.

Johimbhe Bark.

(V. C. P.) We have made a number of inquiries among importing houses and drug jobbers in this city, and none of them has this bark or any of its preparations in stock. They explain the absence of the drug from the market by stating that it is a new remedy, having only just made its appearance, and as yet there is little or no demand for it. Most any dealer will import it for you upon order. Write Merck & Co., Parke, Davis & Co., Lehn & Fink, or any of the wholesale druggists in this city.

Pasteurine.

Thomas J. Walton, Jr., St. Louis, submits the following formula:

Boric acid	9½ parts
Oil eucalyptus	¼ part
Oil wintergreen	2 parts
Oil cassia	1½ parts
Menthol	1 part
Formaldehyde	1 part
Carbolic acid	¾ part
Glycerine	8 parts
Alcohol	40 parts
Water	480 parts
Caramel coloring	q. s.

Dissolve the oils, carbolic acid and menthol in the alcohol, and the boric acid in the glycerine. Mix the two solutions, add 20 parts of fuller's earth and shake thoroughly; add the water and coloring, again shake and filter.

Elixir Lactated Pepsin, Bismuth and Strychnine.

(W. C. E.) An elixir containing these substances may be prepared with compound elixir of pepsin of the National Formulary, as follows:

Bismuth and ammonium citrate.....	256 grains
Water of ammonia, U. S. P.....	A sufficient quantity.
Strychnine sulphate	1½ grains
Water	2 ounces
Compound elixir of pepsin, N. F., enough to make.....	16 fl. ounces

Dissolve the bismuth and ammonium citrate in 2 ounces of warm water, allow the solution to stand until clear, if necessary; then decant the clear liquid, and add to the residue just enough water of ammonia to dissolve it, carefully avoiding an excess. Mix the two solutions and add to enough compound elixir of pepsin (in which the strychnine has previously dissolved) to make one

plant. Mixtures containing pepsin and bismuth and ammonium citrate must be neutral in reaction.

Marketing Ginseng.

(N. E. S.) Nearly all wholesale druggists are purchasers of ginseng. One of the largest buyers in this part of the country is T. A. Bronson, No. 54 Cedar street, this city, and he informs us that he is offering to-day \$3.35 per pound for fair average quality of root from your section of Canada (Ontario). Regarding the treatment of roots after gathering, Mr. Bronson says: "After digging, shake off all adhering earth, wash thoroughly in running water, if possible, or in tubs, using fresh, clean water; never split the roots to hasten drying, as it injures their value. Dry in a well ventilated shed or garret, spread out thin and turn the roots every day, taking out any mouldy pieces. Never dry in stoves or chimnies, as either method darkens the roots. Break off all tops close to the root, also all small fibers. When thoroughly dry, pack in barrels or boxes (not in bags), to prevent breakage in transportation. The larger, cleaner and more entire ginseng is, when put on the market, the greater its value. There is no import duty on ginseng.

Master in Pharmacy.

(Ambitious.) "Master in pharmacy" is a degree conferred by a number of colleges and schools of pharmacy, notably Buffalo, Philadelphia and Pittsburg colleges of pharmacy and Vanderbilt and Wisconsin Universities. The requirements for obtaining the degree are not at all uniform. Thus, the Pittsburg College of Pharmacy offers the degree to its own graduates, who, after graduation (as Ph. Gs) will continue for at least five years in the practice of pharmacy and will then submit to the faculty and examining committee a satisfactory thesis or dissertation embodying the results of original research or investigation upon a subject allied to pharmacy. Vanerbilt University will confer the degree upon candidates who have received the degree of Ph. G. or Ph. C. from that institution, or from some other having equivalent requirements for graduation in pharmacy, and who have pursued at the university for one year after graduation, advanced work in pharmacy or in some science or sciences closely allied to pharmacy, etc., and have prepared a thesis satisfactory to the faculty. The requirements for this degree are set forth in the prospectuses of the colleges named, and we suggest you correspond with these institutions, asking them for just the information you want.

"Lapis Baptistae."

(G. Mc.) According to Wilder "lapis baptiste" is the natural soapstone, possibly from a certain celebrated locality, and talcum is the ordinary kind as usually found. Regarding the etymology of the term, he says: "At this late day it is hard to tell for a certainty. Apparently, the name 'Baptista' has some connection with 'Baptisterium'—a baptismal font—and it might be surmised that the, or, a holy baptismal font was cut from soapstone, and that later the mineral from a certain locality was, par excellence, called 'Baptismal stone.'"

Some years ago, Dr. Charles Rice gave to this journal the following information concerning "lapis baptiste" as it appeared in a formula for a toilet powder, which occurs in a work on cosmetics: "In the original German text is printed, 'Taufstein (Lapis Baptistae)'. The Taufstein should be 'Tuf-stein' or 'Tuff-stein', the latter designating a calcareous stone (Tufa). Somebody, at some time or other, used in place of the correct word 'Tuf-stein', the term 'Taufstein' through a misunderstanding, and somebody wanting to translate this into Latin made it, quite naturally, 'Lapis Baptistae', which means the 'Stone of the Baptist.' Of course, 'Baptista,' when it occurs by itself as a noun is usually synonymous with 'Johannes Baptistae.' Hence, I would not have been at all surprised if the person who misunderstood the German 'Tuf-stein' and thought it equivalent to 'Taufstein' had coined an additional Latin synonym, namely, 'Lapis Sancti Johannis.' As a matter of fact, he did not do so, and I am glad he did not, as it would no doubt have caused fruitless search through literature to others, just as the present one seems to have done."

"Cheap" Flavoring Extracts.

(N. E. S.) The following formulas are types of the so-called "cheap" flavoring extracts, inasmuch as they can be diluted with water, their strength depending wholly upon the elasticity of the manufacturer's conscience. They are not recommended to take the place of the regular official extracts, but they are much superior to the ordinary extracts sold by peddlars, in that they contain no deleterious substances.

Peppermint.

Oil of peppermint	1 ounce
Alcohol	2 ounces
Magnesium carbonate	$\frac{1}{2}$ ounce
Water	6 ounces
Chlorophyl, water soluble	q. s.

Mix the oil and magnesium carbonate intimately, put them in the filter, pour on the alcohol and afterward the water.

Wintergreen.

Oil of wintergreen	$1\frac{1}{2}$ ounces
Alcohol	6 ounces
Magnesium carbonate	1 ounce
Water, enough to make	16 ounces
Color with tincture cubebar	q. s.

Orange.

Pure oil of orange	$1\frac{1}{4}$ fl. ounces
Carbonate of magnesium	2 ounces
Alcohol	12 fl. ounces
Water sufficient to make	2 pints

Dissolve the oil of orange in the alcohol and rub it with the carbonate of magnesium in a mortar, pour the mixture into a quart bottle and fill the bottle with water; allow to macerate for a week or more, shaking every day; then filter through paper, adding enough water through the filter to make two pints.

Lemon.

Oil of lemon	$1\frac{1}{4}$ fl. ounces
Carbonate of magnesium	2 ounces
Alcohol	12 fl. ounces
Water sufficient to make	2 pints

Proceed as directed above.

A soluble extract, i. e., one which can be diluted with water, may be made according to the following formula proposed by George C. De Lessing, of this city:

One ounce of lemon oil in a 12-ounce glass separator with a stopcock, is mixed with 10 ounces of diluted alcohol of 50 per cent. (sp. gr. 0.9335) and well shaken. After about twenty-four hours, separate the oil from the diluted alcohol, when the latter will be found to be a saturated solution of the soluble parts of the lemon oil, containing about 16 grains of citral and citronellal. Lemon water is prepared by mixing $\frac{1}{2}$ or 1 ounce of the alcoholic solution so made with a gallon of distilled water and filtering, if necessary, through purified talcum. (The use of carbonate of magnesia is thus avoided). If a stronger solution of oil in water is desired, larger quantities of the essence must be used. To produce a clear solution, add to each gallon of water 1 ounce of polysolve (ammonium sulphocinoleate). No filtering is then necessary.

Additional remarks by Mr. De Lessing on the solubility of oil of lemon in aqueous solution may be found in the March 7, 1895, Era, page 304.

Vanilla (With Tonka).

Vanilla beans in small pieces, 4 ounces, rubbed up in a mortar with two or three times its bulk of sugar, and then 8 ounces of tonka beans in fine powder added, and the whole mixed, packed firmly in a percolator without moistening, and then percolate with a mixture of 3 quarts of water and 1 quart of alcohol.

By increasing or lessening the amount of vanilla, you can, of course, make an extract costing any price desired.

Extract of Vanilla from Vanilla.

Vanillin crystals	$\frac{1}{2}$ ounce
Cologne spirit	2 pints
Distilled water	4 pints
Syrup	2 pints

Dissolve the vanillin in the cologne spirit, add the water, shake well and add the syrup. This preparation may be colored with caramel if desired.

A preparation containing both vanilla and cumarin is sometimes used as a flavoring agent. For a typical formula of this character see the National Formulary, revised edition, "compound tincture of vanillin."

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XX.

NEW YORK, JULY 21, 1898.

No. 3.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

	PAGE.		PAGE.
EDITORIAL	69	Supply of Stamps Still In-	
What Boards of Pharmacy		sufficient; Stamp Tax on	
Think of the Era Course.	71	Important Goods: Stencil	
CORRESPONDENCE.....	72	Cases of Stamped Goods:	
ORIGINAL AND SE-		Hudnut Creditors Grant	
LECTED PAPERS.		Extension.....	87
Drug Adulteration in New		Protest of Wheeling	
York State.....	72	Druggists; Telegrams	
Seen and Heard About the		Must Be Stamped by	
Soda Fountain.....	74	Senders; Litigation over	
Chemistry of High Tem-		Seeley Truss Business...	88
peratures	75	Curious Proceeding	
From Cape Town to Yoko-		Against Brooklyn Drug-	
hama.....	77	gist: Important Change	
PHARMACY.....	79	In Old Drug Company...	89
QUESTION BOX.....	81	NEWS LETTERS	90
NEWS AND TRADE DE-		BUSINESS RECORD.....	96
PARTMENT	83	Associations	97
Applying the Medicine		Colleges.....	98
Stamp Tax.....	83	Boards.....	98
Taxability of Medicinal		STATE OF TRADE.....	99
Samples; New Rulings		MARKET REPORTS ...	100
by the Commissioner....	86		

A PHARMACEUTICAL EDUCATION

The success attained during the first year of The Era Course in Pharmacy (1897-98) has been something remarkable. Over 1,000 students were enrolled in the Junior class, and the general excellence of the work performed by them is strong evidence that the opportunity afforded by the Course for obtaining a thorough and systematic pharmaceutical education at a small expense is highly appreciated.

The Course is divided into two years, junior and senior, of about 40 weeks each, and covers in scope all the subjects included in the college curriculum. The lectures are published in the Era and quizzes and examinations are conducted by mail. The next term begins September 1st, 1898, with both junior and senior classes. A prospectus, now in preparation, giving full details of courses, outlining method of conducting the work, terms for tuition, etc., will be sent upon request.

Address,

THE PHARMACEUTICAL ERA.
Box 1483, New York.

A Question of Saltpetre.

A retribution more or less righteous has overtaken us. We have, perhaps, boasted too honestly and over-much of our accomplishments and resources in piping times of peace, and now that we are having a side show affair with the countrymen of Don Quixote, some of our friends in the land of our grandmas are seizing the opportunity to make remarks.

When the 4 per cent. tax proposition was worrying, a few weeks ago, we remarked that the drug trade was perfectly willing to be taxed, but did not care to be overtaxed. Later we volunteered the information that the drug trade was fairly well satisfied with the reduction to 2½ cents, and would pay its stamp taxes willingly and promptly. Thereupon our esteemed contemporary, the Chemist and Druggist, of London (England, not Ohio), remarks in that peculiar style which distinguishes British attempts at persiflage: "A very pleasant and proper sort of feeling; but as the whole proceeds of the tax will not probably pay the cost of the saltpetre consumed in a single day's fighting, it would seem that the occasion for the sentiment might have been better chosen." We are not oversensitive in such matters, but such cock-sure observations leave us in a state of terrible doubt. Ordinarily, we suffer and writhe in silence and seclusion when our foreign friends create geographical disturbances by placing St. Louis in Florida, or Denver in Rhode Island. We do not remonstrate, because we charitably regard such errors as due to provincialism, or to ignorance, which is a kind of fad, and, therefore, a matter of no little pride and satisfaction, "don't ye know."

But really we don't know how to take this matter of war taxes and salt-petre. It is quite beyond us. We must be terrible fighters and burners of potassium nitrate, or else our capabilities for taxation have been underestimated. In this state of uncertainty we can do no better than submit a few figures, and after they have been reduced to turpence or ha' penny, we may be enlightened.

For instance, the Collector of the Second Internal Revenue District of New York City disposed of 7,395,500 proprietary stamps worth \$58,928.71, from July 1 to July 11 (about seven business days). As there are five districts in Greater New York, and the Second is in the drug section, it may be assumed with modesty that the 4,000,000 population of the city "consumed" at least \$100,000 worth of stamps. This reduces the matter to a simple problem: "If 4,000,000 people use \$100,000 worth of stamps in seven days, how many stamps will 80,000,000 people use in six months?" It has been estimated that our ammunition expended against the fortifications of Santiago has cost \$4,000,000, and there has been a total for this war item of \$5,000,000. Just what the saltpetre percentage in this may be we are unable to estimate. We have been burning this \$5,000,000 worth of ammunition since May 1, 75 days, and have, perhaps, had a dozen engagements, so that the divisor may be either 75 or 12, making the daily expense either \$65,000 or \$416,000. Instead of the whole proceeds of the tax only paying the saltpetre expense for one day's fighting, it is quite

likely to pay for all the ammunition for all the fighting. If this is not enough we might quietly observe that the Government's request for a little loan of \$200,000,000 brought out subscriptions for \$1,200,000,000.

Retailers in Earnest.

Retail druggists all over the country continue to protest against being forced by the manufacturers to bear any of the expense of the war tax on proprietary medicines. In our last issue we spoke of the significance of this general protest, and instanced a number of places where radical action had been taken. Perhaps the most thorough and organized opposition comes from Oklahoma. There the Pharmaceutical Association has passed the following resolutions:

We, the undersigned members of the Oklahoma Pharmaceutical Association and Druggists of Oklahoma Territory, in convention assembled, hereby agree upon our honor that we will not accept advertising matter, nor keep for distribution in our places of business any sort of advertising, nor permit our names to appear in any of the Territorial papers beneath the local advertisements of any patent medicine firms who have on account of the stamp tax raised the price of their medicines.

We further pledge ourselves to discourage the use of all medicines that have been advanced in price on account of the stamp tax until prices have been reduced to the established prices in force prior to July 1, 1898.

We feel that the patriotism of these large institutions that have grown wealthy at the expense of the people of this country, is at an extremely low ebb when they force upon the retail druggists not only the full burden of this tax, but in addition thereto a large profit on the money they invest in revenue stamps, and we ask that they show their patriotism by at once placing in force the old prices and bearing their share of the burdens of war taxation.

The president of the association has sent these resolutions to every druggist in the territory, and in his circular says:

I therefore request that you sign this resolution and return in enclosed envelope by return mail, and that you proceed at once to carry into effect its provisions. I think we should go even further and agree not to patronize any newspaper which carries the advertisement of patent medicines houses who have raised their price on account of the tax or for any other reason. In fact, I would be in favor of refusing to purchase any preparation that would cost more than \$7.50 per dozen for \$1 preparations and in like proportions for other prices.

The course pursued by most manufacturers in continually belittling the pharmacist in their advertising and advancing their price to the retailer, thinking that their price would be paid by us regardless of profit, should now be met with a decided stand by the pharmacists of the United States, and let Oklahoma take the initiative in the good work.

A correspondent (who writes that "the advance on patents is a hardship on the retail druggists, especially in small towns. It cannot be of any advantage to any but large places where they are cutting") sends the following circular, which has been mailed to every druggist in Illinois:

In consequence of the war revenue law and the hardships thrown on the retail druggist by the manufacturers of patent medicines, charging exorbitant prices on their remedies, we, the retail druggists of Saline County, State of Illinois, have agreed to drop from our stock all patents where the price has been raised on account of the War Revenue law, and from this day on will not supply the demand for such remedies. We feel justifiable in this action on the grounds that an advance on patent medicines is an imposition on the retail druggists, and we urge all of them throughout the United States to adopt the same procedure and push the matter through your drug journals until the patent medicine manufacturers recognize our demand and grant same.

Good for Lynn.

A correspondent writes:

It may interest you to learn that the Lynn (Mass.) Druggists' Association, which for four or five years has been practically dead, has been revived. Every druggist in the city has joined, and a new price list has been issued, which makes a considerable advance in the prices of all the badly cut patents. The druggists as a whole say there is very little trouble in getting the increased prices.

This letter tempts us to say "we told you so." What

has been done in Lynn can be done elsewhere, and just as easily.

Good, Also, for Birmingham.

Birmingham, Ala., is another city over which the white-winged bird of peace now spreads her snowy pinions; the cut-rate war is ended, and all have gone back to old prices. We might tell the whole history, which is very interesting, of this war, but why? The fact that it has ended so satisfactorily is, alone, sufficiently interesting. It may be noted, however, that the necessity for raising prices to cover the additional cost due to the war tax, made it the more feasible to boost prices way back to original figures. The most radical of the cutters are in on the new deal, and assert their intention to remain in the game. And every one is happy again.

Sign Your Name.

We have received a letter marked "important," which reads:

I now ask you as a favor to the druggists who have to be licensed to call the attention in your next issue of your paper of the ——— B. of P. to the fact that the drug store at ——— is operated by a man who could not pass examination, having tried time and again. He has run this store for almost a year without even a certificate from any board. I have heard that the board had been notified, but to no effect. Kindly print this in your next issue, and oblige a subscriber.

We are sorry that we have a subscriber who is afraid or ashamed to sign his name to his letters. Anonymity is the coward's weapon, and a very unserviceable one, too. This letter, though referring to affairs in another State, was mailed in Brooklyn. Did our correspondent for one moment really believe that we or the board he attacks would give serious attention to his anonymous accusation? Come out like a man, dear sir, sign your name. Your confidence will be respected by the board, and you may achieve what you are aiming at. It is not possible, is it, that you are merely endeavoring to gratify a private spite?

Whose is the Responsibility?

A firm of retail druggists in an Indiana town are defendants in a suit for \$5,000 damages brought by a boy who claims that he was employed by the defendants to attend to a soda fountain in their drug store; that he had no knowledge of drugs or the compounding of the same; that the defendants ordered him to help in the drug department of their store, mixing and compounding medicines and drugs; that while engaged at the direction of the defendants on June 3, mixing nitric acid and mercury, he closed the vessel in which the mixture was and there was an immediate explosion, the acid covering the right side of the face, burning it in a horrible manner, from which a large scar will be left, and permanently injuring his right eye. He says he was put to great expense and suffered great physical pain on account of the injury which, it is alleged, was due to the negligence of the defendants in having him mix drugs when not acquainted with them.

We do not wish to prejudice this case, but if the facts are exactly as above reported, it certainly would seem that the boy has a strong argument. One of the strongest obligations upon the employer is to instruct and warn his help concerning any hazardous operation they are called upon to undertake. In the drug business especially is eternal vigilance the price of safety. Any druggist ought, and may reasonably be expected, to know that to put a green boy at the task of dissolving mercury in nitric acid is decidedly risky. Had the incident happened in any other State

than Indiana we could indulge in much sermonizing and point many a moral, but, as Indiana has no laws to regulate the practice of pharmacy and confine it to properly qualified persons, what's the use? We shall be curious to learn how this case is decided, whether the druggists or the boy were careless, in the eyes of the law.

Long-Necked Nurses.

The long-necked nursing-bottle question has stirred up a lot of trouble in Buffalo. As has been reported in this journal, a number, and of the most prominent, druggists of that city were arrested, charged with selling the objectionable bottle in direct violation of the ordinance which had been secured by the Board of Health, the complainant. One druggist stood trial, was found guilty and fined, the court holding that the ordinance was presumptively reasonable, as the bottles in question are detrimental and injurious to public health. The other druggists, backed by the local pharmaceutical association, will carry their cases up to last resort.

And now there is a hot time in the old town. The druggists say they are being persecuted; the health officer says the druggists did not sin ignorantly, having been fully informed of the nature of the ordinance, and the physicians quite generally are upholding him in the fight. It can be said of Buffalo's chief health officer that through his methods of sanitation, disinfection and looking after the public health generally, he has secured for that city a record which is the envy of the health boards of other cities. He is a fighter, and when he sets out to remedy an evil he generally gets there. In the present case, no one, apparently, denies that the long rubber-necked bottles are dangerous, but some think that the health officer has been a little too arbitrary in his action. But he has the law on his side, and that is a powerful weapon.

WHAT BOARDS OF PHARMACY THINK OF THE ERA COURSE IN PHARMACY.

Tennessee Board of Pharmacy.—It gives me great pleasure to be able to state that I have read with much interest the course of lectures now being published in the Era. I have framed from them a good many of the questions which have been given in the examinations of our board. I have recommended the course to many who have written me asking what course of study to pursue before coming up for examination. I believe it to be the very thing for a young man who is learning the drug business, and also for us who have had a great deal of experience and think we know "much." I get ideas from every lecture I read, which puts the subject in a new light. I can with pleasure recommend the course to all who are interested in learning pharmacy, and shall always speak favorably of it. With best wishes for the success of the Era and its Course in Pharmacy.—J. O. Lurge, Secretary.

Rhode Island Board of Pharmacy.—The course when first outlined met with my hearty endorsement, and the papers since published on the various subjects have more fully confirmed the opinion formed at that time. Although I am personally a strong advocate of a collegiate training for every student of pharmacy, I am aware that in many cases this is impracticable and impossible. To all such persons the Era has offered a most worthy substitute—one that is sufficiently broad, and yet not so difficult as to discourage or confuse those for whose benefit it was intended. I have recommended the course to several who have since enrolled as students, and shall continue to do so.—William R. Potter, Secretary.

West Virginia Board of Pharmacy.—I take great pleasure in saying that I consider the Era Course in Pharmacy among the very best plans of pharmaceutical training obtainable outside of a regular college of pharmacy. If given proper attention, this course will give a student a knowledge of pharmacy and its allied sciences which years of their own research could not give. We especially commend the course to those whose pecuniary circumstances will not allow them to take a college course. They get the same substance (except laboratory work) as given in our best colleges, because the most eminent pharmaceutical teachers of the entire country are contributors to the course.—H. P. Pfost, Secretary.

Ohio Board of Pharmacy.—I know of no more thorough, practical and useful course of study in the science of pharmacy than that offered by the Era Course for any

NOTICE TO STUDENTS OF THE ERA COURSE.

The period within which examination papers can be mailed to the Director's office has been extended to July 30th. Examination papers mailed after that date cannot be considered in the prize contest.

Students in arrears upon any of the recitations can send in their answers any time during the summer, but their grades will not be returned to them until after the opening of the fall term.

The fact that a student has not recited upon all of the lectures of the course does not bar him from taking the examination.

J. H. BEAL,

Director of the Era Course in Pharmacy.

person who has not the opportunity to take a regular course in one of the good schools of pharmacy which this country affords. If applicant for registration by boards of pharmacy would subscribe to such a course, and faithfully pursue it, more of them would not only succeed in securing registration, but would also be vastly better qualified for the intricate duties devolving upon the pharmacist.—W. R. Ogier, Secretary.

New Hampshire Board of Pharmacy.—Having become familiar with the character of the Era Course in Pharmacy which was instituted a year ago, to provide a comprehensive, graded, thorough course of home study in pharmacy, I am glad to recognize it as a great help and eminently satisfactory to the large number of students who have completed the first junior year. I give the above as my candid opinion in relation to this work, and am pleased to add my name as a testimonial to the Era Course.—Geo. F. Underhill, Secretary.

Georgia Board of Pharmacy.—I have been much pleased with the Era Course in Pharmacy, and think it specially valuable to that large class of young men who cannot attend colleges of pharmacy. It will also prove very beneficial to those preparing to enter college, and particularly to those expecting to stand examinations before State boards. You are certainly to be congratulated upon securing for this work so able a director and strong body of teachers.—Henry R. Slack, Secretary.

Wisconsin Board of Pharmacy.—I have read with considerable interest your Pharmacy Course the past year, and am glad that such a course is open to the student at such small expense. You seem to cover the ground fully and it will result in benefit to many of the older ones as well as to the boys who are preparing themselves for the profession. Please accept my best wishes for your continued success.—E. B. Heimstreet, Secretary.

Vermont Board of Pharmacy.—I can say many good things of your Era Course in Pharmacy. I heartily endorse this method of teaching young men pharmacy at home. I consider it a grand opportunity for those who cannot afford to attend a college. Your course teaches all that is required in colleges, and the expense is simply nothing, as compared. I consider it a splendid way to educate pharmacists.—J. G. Bellrose, Secretary.

Connecticut Board of Pharmacy.—I have had but little opportunity to judge of the real merits of the course thus far. But the plan is one that meets my hearty approval as the proper one to pursue, and I have advised several who have applied to me for advice to give such matters to take the course as a means of preparing them for examination by the Board of Pharmacy.—H. M. Bishop, Secretary.

Maine Board of Pharmacy.—I have been very much interested in the Era Course in Pharmacy, and would say it is a most useful and instructive course for a young man unable to attend a good college of pharmacy, giving the proper direction in reading and study necessary for him to become a skillful pharmacist.—Frank R. Partridge, Secretary.

Nebraska Board of Pharmacy.—I cannot but recommend The Era Course in Pharmacy as a valuable aid in qualifying students for the examination of a board of pharmacy. It is a good thing; push it along.—A. W. Buchheit, Secretary.

North Dakota Board of Pharmacy.—The junior course that you have furnished has been excellent, just what is wanted for home study. It is a good preparatory course before entering college.—W. S. Parker, Secretary.

Kentucky Board of Pharmacy.—The Era Course in pharmacy is admirably adapted to home study. Every young man who cannot attend a school of pharmacy should take it.—J. W. Gayle, Secretary.

Illinois Board of Pharmacy.—I regard the Era Course in Pharmacy as a very excellent method of home study.—Frank Fleury, Secretary.

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

EVADÉ THE WAR TAX.

Missouri Valley, Iowa, July 11, 1898.

To the Editor.—I hope you may give me space in your columns at this time, as I have been a constant reader of the Era for 5 years, and have never asked for space before. It is amusing and at the same time very provoking to read the different circulars sent out by patent medicine manufacturers giving the revised prices for their respective preparations. One claims that the profit on their business for the past three years will not pay for stamps sufficient to stamp their preparations. Another claims it is to help the cutter get full prices for what he sells, etc. It seems to me that just at this time many of the manufacturers have developed a kindly feeling for the cutter. The cutter as a rule deserves no sympathy, because he cuts in order to force trade, and now when he has an opportunity to put his prices up to regular, what does he do? He advances the price from two to five cents per bottle and goes on doing business. There is the desire on the part of the manufacturers to heap coals of fire upon the heads of the thousands of retail druggists who do get full prices for patents, to presumably assist the cutter. The majority of those who have taken advantage of an existing condition have clearly shown their relation to swine by advancing the price double and in some instances three times what the tax amounts to. The retail druggists of the country should put the stamp of disapproval upon such action and absolutely refuse to handle goods put out by a concern which has no regard for the men who put its goods out. I am pleased to note that in this section of the country the feeling among the retail trade and also the traveling salesmen is to relegate all patents of this class to the rear. The war tax is a necessity, and what was intended by the framers of the law no doubt was that manufacturers should pay a part of it as well as the retailers, but as the matter now stands the retailer not only pays all the tax put on many of the patents, but also is asked to pay the manufacturer a bonus for handling his goods during war time. Retail druggists who sit idly by and make no protest may soon expect that something will happen to give them another excuse for raising the price.

We all know, who have been in business any length of time, that the actual cost of producing the patents is at least 25 per cent. less than ten to fifteen years ago, and the cost to the retailer on many of them is 25 to 30 per cent. more than it was at that time. Is it not about time for the retail druggist to come out and assert his rights?

G. S. OSBORNE.

WILL STICK TO FULL PRICES.

Rushford, N. Y.

To the Editor:

Hardly any patent medicine manufacturers lowered prices when the revenue was taken off some years since. The majority have raised prices now. I propose to stand by the ones who don't. I am going to sell all patents at the marked price. The manufacturer makes a profit; if I sell his goods I am going to have a profit. The extra profit gained will more than make up for losses on sales at cut prices. If a man wants a bottle of medicine he will pay the marked price just as quickly as well, unless he has struck the cut-rate fend.

E. C. GILBERT.

TANNOFORM CEMENT.—Dr. Dzierzawski uses as a filling for pulp-cavities and root canals of the teeth a combination of Mercet's tannoform and formalin, which forms a plastic mass and is very easily applied. It immediately exerts a powerful and lasting antiseptic action. The mixture has been used with success in thousands of cases, and has the only disadvantage that teeth so treated at times assume a reddish gray color. This, however, proves that the tooth is thoroughly saturated with the antiseptic. (Ph. Post.)

DRUG ADULTERATION IN NEW YORK

STATE.*

It is with some hesitancy that this committee submits its report, for the reason that it is neither so exhaustive as might have been expected, nor so diversified as it possibly could have been. However there are many good and valid reasons why a report of this kind should, as a matter of course, be incomplete, the foremost being the vastness of the field and the lack of time—for at best the time devoted to such research work is limited. Furthermore, the collection of samples from the different towns and cities is attended with such difficulties and so much expense that it is almost prohibitory. Work of this nature should extend over a period of years, and in order to be of value it should not be sporadic, but systematic.

The Boards of Health have done a great deal of missionary work in this direction, but it is only just and right that the pharmaceutical associations of the different States should take the lead, and it certainly would be a good move if concerted action and division of field could be attained. The apothecary is unquestionably the person who can best discriminate between what is to be expected in practice and from a drug or pharmaceutical preparation, as far as purity and general properties are concerned, and what would constitute either willful adulteration or deterioration due to ignorance or neglect.

Turning for a moment to the past, we can observe the rapid changes which are going on everywhere, in commerce, as well as in science, and no one can deny that pharmacy of to-day hardly allows of a comparison with pharmacy of the past. Those of the fraternity who entered upon the practice of pharmacy thirty or forty years ago remember well that the laboratory was then constantly in use for making small supplies of chemicals and tinctures and infusions, decoctions, ointments, pills and plasters, and that in many places crude drugs in the shape of fresh roots or herbs were brought to the store in small parcels, and were cleaned and dried by the apothecary in his garret. A large number of pharmaceutical and galenical preparations were prepared by him, as the mammoth establishments which now supply his wants were then in their infancy. All this has changed, and with it the output, the appearance and even the routine of the drug store. Formerly complex mixtures were prepared behind the prescription counter, but they are nowadays either very simple, or else they are the physician's order, calling for A's, or B's, or C's elixirs, pills, tablets or other elegant preparations which are offered ready made, and which are dispensed without the least labor, effort or exercise of skill on the part of the druggist. These ready-made medicines have found favor with the doctors and through them with the public. Formerly rhubarb and senna, epsom salts and many other simple remedies were sold over the counter, but nowadays we hardly have any demand for these goods. How often in the course of a year has the apothecary of the present occasion to sell crude drugs or simple remedies, such as valerian, etc., over the counter? Aside from this, a vast number of organic compounds are trumpeted forth as valuable remedies and offered by the manufacturing chemists, and many of them are in daily use with the physicians. These medicines have helped to bring about a remarkable change, for they have, to a great extent, superseded the officially recognized remedies of the Pharmacopoeia.

To enter upon an examination of these so-called "new remedies" seemed to be rather outside the scope of this inquiry, and the members of the committee have, therefore, confined their work to preparations which are officially recognized in the U. S. P. There they were confronted with not a few chemicals, which will deteriorate in a longer or shorter period of time, and which, therefore, make the task imposed a rather disagreeable one. After having thus tersely defined the position taken by the committee it only remains to show what has been done.

We have collected samples of pharmaceutical preparations and chemicals from many places, representing the

* Report of the Committee on Adulteration, read at the Rochester meeting of the New York State Pharmaceutical Association.

northern, eastern, southern and western sections of the State, have subjected them to the tests laid down in the U. S. P., and herewith lay before you the results obtained.

Many of the standard pharmaceutical preparations which the apothecary either manufacturers himself or which he buys were examined, and it is gratifying to be able to state that, with few exceptions, they have far exceeded our expectations, and this is especially the case with such tinctures and syrups as have come under our observation. Some essences were found not to be up to the standard required by the U. S. P., but were of a quality which the public demands, and were evidently made to suit the price which the people are willing to pay. However, when we came to look into the quality of those remedies where deterioration on keeping, or where carelessness in manipulations, neglect or other reasons could play an important part, we found variations which were not satisfactory. This is the case with the

TINCTURA OPII, U. S. P.—Ten samples of this important preparation were collected. The Pharmacopœia requires that tincture of opium shall contain from 1.3 to 1.5 grams of crystallized morphine in each 100 Cc. The examination based upon the U. S. P. assay process gave the following results:

Sample.	Per cent.	Sample.	Per cent.
1.....	1.6	6.....	0.91
2.....	1.4	7.....	0.88
3.....	1.2	8.....	0.73
4.....	0.98	9.....	0.61
5.....	0.92	10.....	0.55

This discrepancy shows that in many cases either moist opium had been substituted, or that the extraction process had been carried out in a careless manner.

In addition to this there is no question in the minds of the committee but that many druggists do not consider it safe to hand over for use to the general public laudanum which is of official strength. Whether this practice is allowable or whether it would be more safe to refuse the sale of the tincture, is something which this committee cannot advantageously decide. Leaving the question one side and turning to the alkaloidal deficiencies revealed by the analysis, it is clear beyond peradventure that the finished tincture should invariably be assayed before taking it into stock, and that it would be a good plan to first prepare a concentrated tincture, say, of 90 per cent. of percolate, assay the same and then dilute it to the required strength.

SPIRITUS ÆTHERIS NITROSI, U. S. P.—The pharmaceutical preparation is but seldom prepared by the druggist from sodium nitrite, sulphuric acid and alcohol, etc., but it is usually a diluted solution of ethyl nitrite obtained by diluting the so-called "concentrated nitrous ether" offered in the market. All of the samples examined conformed to several of the properties attributed to this liquid by the U. S. P., but they showed remarkable discrepancies when subjected to the nitrometer test. Two only of the samples approached the requirements of the U. S. P., showing about 4 per cent. of ethyl nitrite, while the rest ranged from 3.60 to 0.60 per cent. Several of the low percentage samples were subjected to fractional distillation, but in two cases only could a willful adulteration with water be discovered. There is only one conclusion left, viz., that sweet spirits of nitre is at best an unstable compound, which should be prepared in small quantities only.

LIQUOR PLUMBI SUBACETATIS, U. S. P.—Four samples of this preparation were examined, which were all found to be within narrow limits of the official requirements, though one might have shown a better specific gravity. This is a chemical which is likely to deteriorate with age and exposure to air, as the formation of small amounts of carbonate can hardly be avoided. It is, therefore, gratifying to note the quality obtained in the market.

SYRUPUS FERRI IODIDI, U. S. P.—Six samples of this syrup were examined, four of which came to within a fraction of the official requirements, while two were considerably below the standard and badly discolored from decomposition.

AQUA AMMONIÆ, U. S. P.—Eight samples were obtained, of which three were of good quality, showing between 8 and 9.6 per cent. of ammonia gas, while the other five showed from 7 per cent. to less than 1 per cent. It is evident that this chemical is largely and willfully adul-

terated for mercenary reasons, due to competition. It is impossible to assume that such discrepancies as found should be due to volatilization of the gas. On the contrary it is evident that the so-called "concentrated ammonia"—the official Aq. Ammonia 28 per cent.—had been diluted with an undue amount of water. There is no excuse for this, as an ordinary hydrometer will indicate the specific gravity, which test alone goes a good way toward indicating the quality of the liquid.

CREOSOTUM, U. S. P.—Dr. Wm. G. Tucker wrote in his annual report to the State Board of Health, in 1893, as follows:

This is described in the Pharmacopœia as "a product of the distillation of wood tar." Beechwood tar is frequently employed, and it consists of a mixture of phenols, chiefly guaiacol and cresol. Crude carboic acid, sometimes designated in the trade "Coal Tar Cresote," and consisting chiefly of phenol and cresol, is very commonly sold for real creosote, because much cheaper, but the substitution should not be made, as the articles possess different properties, and when creosote is called for, the true article should be supplied. From the following table (not produced here) it will be seen that out the 223 samples furnished, only 119 were real creosote of good quality. One was of fair quality, and the remainder consisted chiefly of carboic acid:

Eight years have elapsed since this report has been published, and the offenders have been notified that they have sold "chiefly carboic acid, not real creosote," and that they had made an error in sale. At the time there was quite a stir in pharmaceutical circles, as many had supposed that the article purchased under the label, "Creosote, German," was true Beechwood tar. It was deemed advisable by this committee to examine a new set of specimens, and to their utter astonishment it was found that fully 50 per cent. of the article sold as creosote was, in fact, carboic acid of doubtful purity, diluted with more or less water, alcohol and glycerin. There is no excuse for the existence of such conditions, as this question has been fully ventilated in the trade papers, as well as in the scientific pharmaceutical journals, and this is particularly inexcusable, since the tests given in the U. S. P. are easily executed, and will promptly reveal the nature of the articles purchased.

SPIRITUS ÆTHERIS COMPOSITUS, U. S. P.—This useful household remedy has been subjected to examination, as it has been found through previously reported examinations, that an article of inferior quality is generally sold over the counter, and, perhaps, also used in prescriptions. We regret to be compelled to report that apparently no change has taken place, as most of the samples showed great inferiority. They were mainly mixtures of water, alcohol and ether in variable proportion, and but few, outside of those specimens which complied with the pharmacopœial requirements, contained traces of ethereal oil, the majority showing none whatever. Such a cheap, spurious and worthless article is either prepared directly by the pharmacist, or it is the cheap by-product obtained in the manufacture of ether bought by wholesale druggists, not on account of quality, but of price. There is no excuse for this, as an article of good quality can either be bought from responsible manufacturers, or it can be prepared without difficulty by the intelligent and careful pharmacist.

ETHER, U. S. P.—Only a few samples of this important agent were examined. All with the exception of one were found to comply with the Pharmacopœial requirements, showing an average specific gravity of 0.726. The sample which was below the required standard showed a specific gravity of 0.750, which clearly indicated that Ether, U. S. P., 1880, had been dispensed, clearly an error in sale. This is a most gratifying result.

TINCTURA IODI, U. S. P.—There seems to be no change in the mode of preparing this article. Evidently the pharmacists seem to believe that the official tincture is too strong for general use, and they, therefore, dilute it with from 25 to 50 per cent. of alcohol before selling it over the counter. Several of the samples examined contained less than 4 per cent. of iodine.

AQUA CHLORI, U. S. P.—None of the samples collected contained a quantity of chlorine approaching the Pharmacopœial requirements. Several showed no trace of the gas. This is excusable with a solution so prone to decomposition, and in view of the fact that it is so seldom prescribed, nearly all the physicians preferring to produce chlorine gas by means of potassium chlorate

and hydrochloric acid. Would it not perhaps be better to eliminate this preparation from the official list, instead of subjecting the physician and the patient to the danger of being supplied with an utterly worthless medicinal agent, which in many cases may prove positively dangerous, especially in diseases where the prompt action of free chlorine gas is required?

AQUA DISTILLATA.—There is not much good to be said of the samples examined; it is astonishing how little attention is paid by the average druggist to this important solvent. True, distilled water should contain no solids, but many of the specimens obtained in drug stores showed as high as 50 parts of solids in 100,000, and one sample, apparently ordinary tap water, contained nearly eight parts of solids in 100,000. If it is understood that distilled water is frequently used in the preparation of eye water for the solution of silver nitrate, it is astonishing how little care is taken to obtain the pure article. Every druggist should make his own distilled water, if for no other reason than to show his employees that he regards the purity of water for medicinal purposes of paramount importance. The appliances for its preparation are quite simple; an ordinary glass retort and a small Liebig's cooler should be found even in the smallest establishment. Distilled water of good quality can also be purchased at a moderate figure.

UNGUENTUM HYDRARGYRI, U. S. P.—The Pharmacopœia requires 50 per cent. of metallic mercury in this ointment. It is rarely made by the retail druggist, but generally bought from wholesale drug houses, who buy from the manufacturer two varieties—one being the official 50 per cent. ointment, the other containing only 33 per cent. of the mercury. Most of the samples collected showed from 29 to 34 per cent. of mercury, indicating that the druggists prefer to dispense over the counter that quality of ointment, which is known to the trade by the name "Mercurial Ointment, one-third mercury."

It should not be inferred from the foregoing that the quality of the drugs and preparations kept in stock by the pharmacists of this State is below the average found everywhere. This inference must be emphatically denied; in fact, quite the contrary is the case, but it goes without saying that there is room for improvement in certain directions.

G. MICHAELIS,
W. G. TUCKER,
F. W. FRANCIS,
Committee.

PHYSIOLOGICAL ACTION OF DIURETIN AND ITS COMPOSITION.—When the diuretic action of various preparations of the caffeine group of compounds began to be studied, it was shown that theobromine is superior to all others, particularly caffeine, in curative power. To meet the necessity for a readily absorbed combination of theobromine diuretin was prepared, which has been supposed to be a molecular compound of sodium-theobromine and sodium salicylate. The disturbing secondary effects of this preparation, but particularly its chemical properties, led Dr. Sztankay to the conjecture that its pharmacologically important constituent is not theobromine-sodium, but a different combination. Theobromine-sodium was prepared by the action of sodium ethylate and water on theobromine. The examination of this body showed that the body contained in diuretin is not theobromine-sodium, but is a molecular union of theobromine and sodium hydroxide, of the formula: $C_7H_5N_3O_2NaOH$. This is also indicated by the fact that the yield of product in the preparation of diuretin is considerably larger than can be explained on the supposition that the heretofore accepted formula is correct, but corresponds more closely to the new formula. According to the author the deleterious secondary effects of diuretin, which show the characteristics of sodium hydrate poisoning, are due principally to the sodium hydrate combined with theobromine. (Ph. Post.).

PHITISIN TABLETS contain each 0.25 Gm. (4 grains) of fresh bronchial gland, and vanilla chocolate to improve the taste. Recommended as specific for all lung diseases. (Ph. Post.).

(Written for the Era.)

SEEN AND HEARD ABOUT THE SODA FOUNTAIN.

By JOSEPH F. HOSTELEY.

Whether, last soda season, you drew daily four, forty or four thousand glasses, don't let your fountain look just the same this year as it did last. Make some radical changes. Shift its position or alter its appearance by a liberal assortment of flowers and tropical plants. Let a new bisque figure bathe beneath the noisy spray that summons men to the shrine of the national beverage. By having two of these images you can use them year about, interesting the public eye by variety. The people appreciate these changes; they feel you are striving to reach a goal—the acme of perfection in the soda drawing industry; endeavoring to excel. Alterations in your apparatus will inspire the interest that does a new window display or a freshly frosted mirror done in colors. If your average last year was four glasses per day or any figure above that, no matter what, you can in this way greatly augment the figure. To please the palate you must appeal to the eye.

Equality in soda serving is essential to a successful fountain. Every detail that tends to insure a favorable issue must be constantly considered. To be careful, courteous and care taking one day and inattentive, indifferent and inactive the next is fatal to paying results. There should be as much harmony at the fountain as within the prescription department. With a drink the water, temperature, flavor and appearance should be in unison. No discord. Highly carbonated water, low temperature, pleasing flavor and inviting appearance are concurrent conditions that realize favorable returns.

Innumerable ideas are offered the druggist to increase soda sales. A capital scheme toward the extension of soda trade in sparsely populated communities, suburbs, villages and towns is the affixing of signboards, advertising your fountain, to fences, trees, etc., which skirt the roads adjacent to your store. These signs should say little, but should be decisive and explicit. They should both invite and direct. To better fill the latter office a hand pointing in the direction of the store might be either painted thereon or form a part of the board itself. At the intersection of roads they should be in evidence, painted neatly and put up strongly. Under a street lamp they can be seen at night. In a few words they should tell the direction and distance to your store. If there is a mile stone on any road thereby, close to it should appear one of your soda guides. In this wheeling age all are not "natives" that traverse the highways. It pays to appeal to the palate of the cyclist. Don't wait for him to hunt for you. Be aggressive; search for him. His thirst is great.

It is a much mooted question whether a glass of soda should be shaken or stirred by hand to facilitate thorough mixing. Many contend that the stream from the faucet is ample means to this end. Certain it is that agitation by whatever medium liberates much of the gas from the water, and it is also obvious to an observer that many operators seem to entirely forget the inherent qualities of both the carbonated water and the gas itself. They seem to entertain the notion that the fluid is all right, gas or no gas, or that the latter will, under no circumstances, depart from the former. They shake and stir, and pour from glass to glass entirely indifferent or ignorant of results. If these dispensers know no better they should be taught, if they are simply heedless they need to be awakened to their duty to the people from whom they expect lucrative consideration.

A methodical effort should be made to leave the store in order when the bolts are snat at night; chairs not standing promiscuously about; no great amount of dirt on the floor, nor scraps of paper nor straws that have seen service; no disorder about the fountain; glasses not standing unwashed in holders, nor the slab wet and stained. Leave things orderly, so that a good impression will be made upon the belated pedestrian who passes the door, and the one who stands gazing in the windows the while he awaits a car.

Usually the druggist who keeps open all night is situated in a much-frequented neighborhood—both by day and night. This device might arrest the attention of the

night-key man. On a piece of cardboard, 8x24, stencil the minutes on which cars pass your door (they doubtless do), and, after framing it neatly, hang in a conspicuous position outside the store, on the pillar or against the casement of the most prominent window. Give a tersely worded cue as to what it is. About it assemble a number of pithily said invitations to drink soda. The chairs inside will look very inviting to a tired amusement lover, and there are great odds in favor of his occupying one while he keeps his eye open for a headlight. Without the time-table he might think that the fates had decreed him to wait but a few minutes, and so he would kick his feet and wait outside.

As soon as a glass has been used for soda purposes remove it from the counter. Do not, however, commit the error so common of standing by the fountain impatiently waiting for a patron to consume a drink that you may cleanse the glass. This is a distasteful, aggravating act. If you consider it too much trouble to walk away and permit the customers to slowly sip their beverages in peace, and when they have finished or departed return and wash the glasses you deserve no attention or consideration from the soda-drinking public. Place yourself in the position of the one to whom you are saying by silent inference: "Make haste and go." What would you think? How would you act? If it were the writer he would do as he always does in a like case—be as slow and deliberate as possible, waste time, worry the inconsiderate, uncivil individual a bit and afterward go elsewhere to quench the thirst. Even now we are fairly boiling with indignation at having been so treated on two consecutive occasions within twenty-four hours. Palpable impatience, like its related transgressor indifference, is an object of scorn about any fountain. Remedy this fault where it exists. Annihilate it. This is one of the cardinal fountain sins. Avoid the thought of penance by shunning it.

Introduce a new drink at certain intervals. Get up some neatly fashioned placards announcing an addition to the flavor list and push the beverage for a time, then concoct another, and put forth your best efforts toward making it meet favor. Keep up the agitation and the interest in your fountain. Get the people guessing as to what is coming next, and keep them on the alert. Some are always ready to try a novelty in the way of a thirst-quencher, who seem to care little for the more common drinks. The cost of formulating a tempting draught, both in reality and in name, is trifling, and it invariably proves a winning ad. for the fountain. You must advertise the latter to make it pay, and you may as well spend your energy and money on something a little different from what the "other fellow" is pushing and take a little trade all of your own. Tempt some of your steady customers with samples of the new arrival, and make yourself and your fountain solid with the customer.

If the wooden foot grating the soda dispensers stand upon is allowed to remain undisturbed for several days a sloppy, slimy mess will form and accumulate beneath it. The grating should be raised and the floor under it thoroughly cleaned daily. A little borax aids greatly in keeping the boards free from odor and muck. Soap and water frequently and regularly applied act well enough, however. It is an excellent expedient toward assuring health and comfort to have two of these gratings and use them day about. A perfectly dry one is then forthcoming every morning. Every seventh day take out the bisque figure from the spray globe and cleanse it with warm water, soap and a small brush. Don't allow a sediment from the water to discolor it.

In the masculine mind phosphates, particularly lemon and orange, are happy hot weather drinks, but not infrequently the phosphate part of the beverage is unsatisfactory—either too much or too little is added; usually the former. A dash of phosphate is all a great many desire; what they get is, often a very lingering dash. If the druggist would get one or a number of small, fancy, but not gaudy bottles, fitted with squirts, and fill them with phosphate, he could stand them on the soda counter and let patrons help themselves. When a man calls for, say, "lemon with a little phosphate," a few drops of the latter could be mixed therewith, and then his attention called to the small container from which he might savor his drink to suit, if it were not already tasty. Glass labels could be obtained and affixed to the bottles. Much phos-

phate could be saved in this way and tastes catered to—some of the finer instincts included. Soda connoisseurs would appreciate this fountain delicacy.

Say you have a patron who invariably drinks egg phosphates. Don't continually mix his preferred drink in the same way; that is, with one certain flavor. Suggest a change. Then blend two or more suitable syrups and observe the result. If you touch his fancy with a special relish, in your mind connect him with it, and let him know that you do, and that only at your fountain can he be served in this peculiar style, he is less likely to be attracted to the store of another.

Clean milk or cream bottles and cans with hot water, in which a small quantity of bicarbonate of soda or borax has been dissolved, rinsing thoroughly in clean water. Holders and spoons may be cleansed in hot water with or without the addition of soap, according to their condition. The use of an old tooth-brush aids much toward cleaning and brightening them, the liberal use of a scrubbing brush and sandpaper keeps the sink sweet and clean. Some free the nickel ware from dirt, one week with whiting or other polishing substances, and the next by rubbing with a wet sponge and a dry Turkish towel.

When administering a seditiz powder or any effervescent salt, be cautious against using a glass so small that a portion of the dose is lost when effervescing occurs. It makes the draught none the more inviting to the patient to see it foam over the glass and the hand of the operator. The same principle applies to drawing soda. Have a care and not to let the full force of the soda stream enter the glass sufficiently to overflow it. Lemon and orange flavors seem breeders of this blunder. Never sprinkle grated nutmeg over a drink before inquiring the taste of the patron. Many do not relish this condiment. We find a few druggists still using natural straws at the fountain. They seem primitive and the people do not like them. At some fountains buttermilk sells well.

The soda that is appreciated and thoroughly enjoyed is the lively, sparkling, biting, bubbling, snapping, fizzing, foaming, pungent kind. Every adjective there is essential to a satisfying drink.

THE CHEMISTRY OF HIGH TEMPERATURES.*

The Franklin Institute of the State of Pennsylvania, for the Promotion of the Mechanic Arts, acting through its Committee on Science and the Arts, investigating the merits of Moissan's investigations with the electric furnace, reports as follows:

The researches conducted by M. Henri Moissan, with the aid of his electrical furnaces, extend over a period of about five years, and have won for this distinguished chemist an additional title to take rank with the foremost exponents of scientific inquiry at the close of this century of science, so auspiciously inaugurated by the great discoveries of Gay Lussac and Sir Humphry Davy.

In preparing a report upon the work of the French chemist, your committee feels that it might well be content to pass in review those brilliant discoveries which have become universally known, and that it would scarcely be possible to refer to all the valuable and interesting results without making the report too voluminous.

At the same time, the committee believes that much of M. Moissan's purely scientific work has not been as generally recognized as it deserves to be, and, therefore, begs to present the following statement:

The application of the high temperatures attainable by means of the electric arc, for the purpose of producing physical and chemical effects, is by no means of recent date. Many important observations on the effects of electric heat were made already by Van Marum, at the close of the last century, and by Humphry Davy, the discoverer of the arc, at the beginning of the present one. In 1849 Despretz utilized the intense heat of the arc in various scientific investigations, and later Pichon, Siemens and Huntingdon, Cowles, Heroult, Brabau, Borchers, Acheson, Willson and many others either suggested or realized the employment of the electric furnace for various industrial purposes.

* Report of the Franklin Institute, through its Committee on Science and the Arts, on the investigations of M. Henri Moissan, with the electric furnace. (Jour. Franklin Inst.)

In all these cases, however, the materials subjected to the arc were directly exposed to and permeated by it. But, while this may not be objectionable in many industrial processes, the presence in the arc of vapors of carbon and other substances emanating from the electrodes, and the attendant electrolytic action, constitute a set of disturbing influences which will generally complicate the results, and render them liable to lead to erroneous conclusions.

Guided by these considerations, M. Moissan endeavored to devise a furnace which would subject bodies to the highest temperatures of the electric arc under simple and controllable conditions. He has constructed five modifications of such a furnace, which are characterized by the following features:

(1.) A furnace consisting of a block of lime, hollowed out, and provided with electrodes in such a manner as to maintain the arc above the substance. The cavity is lined with suitable materials.

(2.) A furnace of fine-grained limestone lined with alternate layers of carbon and magnesia, the former on the inside. This construction permits the use of higher temperatures than the preceding one, and is well adapted for receiving crucibles.

(3.) A furnace provided with a tube of refractory material, passing horizontally through the cavity. This arrangement affords a heated space, which is accessible from without, and protected from the action of any gases existing within the furnace. When desired, currents of gases or vapors can be passed through the tube while it is being heated.

(4.) A furnace in which the tube is given an inclined position, which permits a continuous operation; the charge is introduced at the upper mouth, while the products are removed or flow from the lower one.

This model was employed for preparing large quantities of pure products in a short time.

(5.) A furnace with a large number of electrodes and arcs.

By this means a considerable space can be evenly heated, and large amounts of material treated in one operation.

By thus excluding electrolytic action, M. Moissan was enabled to investigate the simple heating effect of the current. The temperature ranged from 2,000° to beyond 3,800° C. While it is not possible to give exact figures for the highest temperature attained, an idea of the conditions may be formed from the description of some of the experiments. The currents employed varied from 35 amperes at 55 volts to about 1,400 amperes at 110 volts.

The results obtained by means of the electric furnace may be considered comprehensively under the following heads:

I.—A SERIES OF RESEARCHES ON THE FUSION AND VOLATILIZATION OF REFRACTORY BODIES.

Various compounds and elements which are either infusible or non-volatile at the highest temperatures attainable by combustion were melted or vaporized when subjected in the furnace, Model 1, to an arc consuming 30 to 40 horse-power of energy. Thus lime, magnesia, molybdenum, tungsten, vanadium and zirconium were readily fused, and lime, silica, copper, platinum, aluminum, boron, carbon and other refractory bodies volatilized. Many of these bodies were obtained, either by fusion or sublimation, in a crystallized form. By heating mixtures of several oxides a series of new double oxides was prepared.

II.—IN A SECOND SERIES OF EXPERIMENTS A NUMBER OF REACTIONS, WHICH CAN BE EFFECTED AT THE HIGHEST TEMPERATURES ONLY, WERE MADE THE SUBJECT OF INVESTIGATION.—The carbonates of barium and strontium were without difficulty resolved into carbonic acid and the oxides. Those oxides which had withstood the deoxidizing action of carbon at the highest temperature of ordinary furnaces were readily reduced by that element in the electric furnace; others, whose reduction by carbon in the wind furnace is difficult or incomplete, readily yielded their oxygen to the carbon under the action of the arc. It was thus possible to obtain aluminum, silicon, the alkaline-earth metals, uranium, vanadium and zirconium. Moreover, manganese, chromium, tungsten and molybdenum were produced in the reguline state and in considerable

quantities. Certain ingenious precautions were observed to prevent the metals named from combining with oxygen, nitrogen and carbon, and to remove the last-named element after a carbide had been formed. As many of these products were for the first time obtained in the pure state or in much larger quantities than before, a careful study of their properties afforded innumerable new and interesting observations, and led to the revision of many statements published by former investigators. The study of chromium and vanadium proved especially interesting. Titanium was found to be converted into the nitride when subjected to an arc produced by a current of 400 amperes and 60 volts, but to remain metallic when a current of 1,200 amperes and 70 volts was employed. Reductions were also effected by substituting metallic reducing agents for the carbon, and interesting new alloys were thus prepared.

III.—THE STUDY OF THE THREE ALLOTROPIC MODIFICATIONS OF CARBON CONSTITUTED A THIRD EXTENDED SERIES OF EXPERIMENTS.—It is impossible here to do more than mention a few of the more important results. The most important, perhaps, and the one which has become universally known, is that ordinary charcoal may, by means of the electrical furnace, be converted into diamond. When molten iron at 3,500° is saturated with carbon and the mass then suddenly chilled on the outside, the enormous pressure produced in the interior will cause part of the carbon which separates to crystallize in the form of diamond. Both the transparent and the black (carbonado) varieties were thus obtained—the former in octahedra and cubes, as well as in fragments; the specific gravity of 3.5, the hardness and all characteristics corresponded to those of the native stone. It is further shown that, at about 3,600°, under ordinary pressure, all the modifications of carbon are converted into graphite, and various varieties of this (the ultimately stable form of carbon) were recognized and studied. The reason for the infusibility of carbon under ordinary pressures was established to be due to the fact that it passes directly from the solid into the gaseous condition. Carbon was actually sublimed and the reactions of its vapor studied.

IV.—THERE YET REMAINS TO CONSIDER THE INVESTIGATIONS OF SEVERAL NEW SERIES OF CRYSTALLIZED COMPOUNDS BELONGING TO THE CLASSES OF BORIDES, SILICIDES AND CARBIDES.—M. Moissan has shown that these compounds, as a rule, have very simple compositions, and that, at the highest attainable temperatures, carbon, silicon, and boron generally form but one compound with another element. The silicides, like Acheson's carborundum, possess extraordinary hardness; some, as those of boron and titanium, appear to be even harder than the diamond. Of the metals, some do not combine with carbon; others while dissolving it at very high temperatures deposit it as graphite before they solidify. A very large number of metals, however, form definite, crystallized carbides. These M. Moissan divides in two classes: those which decompose water at ordinary temperatures, as, for example, the carbides of the metals of the alkalies and alkaline earths, of aluminum, cerium, etc.; and those which do not react in this manner, and which include the carbides of chromium and titanium.

It appears that M. Moissan was the first to produce the crystallized calcium carbide in the electric furnace. He has also exhaustively studied the action of the various carbides on water. In a few cases, as with calcium carbide, there resulted a single hydrocarbon in a pure state; in others, mixtures of hydrogen with one or several hydrocarbons, such as methane, ethylene and acetylene. The most interesting carbides in this respect, however, are those of cerium and uranium. They were found to yield not only gaseous hydrocarbons, but considerable quantities of liquid and solid hydrocarbons.

M. Moissan believes that analogous reactions play an important role in the formation of natural gas, petroleum and other natural hydrocarbons; he has advanced a new and interesting theory in regard to this.

The above is but a meagre resumé of the work done by M. Moissan with the electric furnace. The enormous number of new and valuable results obtained by him necessitated a selection. In studying the effects of extreme temperatures, the French chemist has opened up

a new and extended field to scientific research, and the harvest already reaped from it has greatly enriched our stores of knowledge in the provinces of chemistry, physics and geology. Innumerable practical applications suggest themselves, and not a few have already been realized.

As a conclusion, we wish further to state that the manner in which he has described, interpreted and summarized his experiments and his results cannot fail to incite others to follow the paths he has prepared, and lead them to further discoveries in this field.

In view of these facts, your committee takes pleasure in stating that the highest award the Franklin Institute can bestow could not find a worthier recipient than the author of these researches.

The Franklin Institute, therefore, awards the Elliot-Cresson Medal to M. Henri Moissan, of Paris, France, for his work on the chemistry of high temperatures.

Adopted at the stated meeting of the Committee on Science and the Arts, held Wednesday, December 1, 1897.

John Birkinbine, President.

Wm. H. Wahl, Secretary.

Countersigned by James Christie, Chairman of the Committee on Science and the Arts.

(Special Correspondence.)

FROM CAPE TOWN TO YOKOHAMA.

Canton, China, May 1, 1898.

This city is most decidedly a contrast to the town from which my last letter to the Era was mailed—Cape Town, South Africa. Between the two places I have traveled many thousands of miles by water and land, again coasted the shores of South and East Africa, to Zanzibar, and there caught a little 8x10 steamer that constituted my home for a tiresome two weeks' trip to Bombay. It was my usual luck to run again into the plague, though this time it was much worse than the year before. However, we will pass by all that subject, as well as any particulars regarding India and her people, for they have been mentioned in former communications.

Ceylon.

I revisited Ceylon, and this time took in some of the interior towns. Ceylon is certainly a very beautiful island, and is as well, a prosperous colony. Colombo being the port town. There you will find nearly all the business, and in our lines, so far as European trade is concerned, there are three concerns that sell drugs and patents in good quantities. However, they are not large concerns, owing to the drugs alone. They handle everything, and, besides selling pills, etc., will make you a suit of clothes or a dress—are, in fact, department stores. So you can easily understand that the drug trade is only a fraction of their business.

They do not seem very anxious to sell in a wholesale way, preferring to supply the big planters and tea estates at a fair profit.

Among the natives there is considerable demand for drugs and patents, and it is a very small concern that does not import direct. Necessarily, their orders are small, but they can do so, since Colombo is blessed with splendid shipping facilities, for nearly every line of boats that go from Europe to Australia, China or Japan, make it a port of call. American products are kept in liberal quantities, and are popular, and there is a chance to increase our sales now that we have a direct monthly service from New York, this line also going to Bombay, Madras and Calcutta, India—a point our shippers should note and take advantage of. Leaving Ceylon, I turned my footsteps toward the rising sun, and again visited Burmah, Straits Settlement, Java, Sumatra—countries that I have mentioned in former letters.

Oriental France.

It took weeks to finish these, but eventually I arrived at Cochinchina, and during the two days I stayed in its capital, Saigon, saw enough to convince me that there was no business to be done in our lines, for the same laws that govern France are in effect there. I looked over two big concerns' stock, and American goods were conspicuous, simply by their absence. Saigon is a very

pretty town, and I should judge a wealthy one, for all that section is very fertile. But it was with a feeling of relief that I saw it disappear in the distance, as our steamer sailed on eastward, for now I commenced to realize that I was homeward bound, with only China, Japan and the Sandwich Islands between me and San Francisco.

Far Cathay.

The first view of Hong Kong, or more properly Victoria, for Hong Kong is the island, as a steamer enters the harbor, is to be remembered always. The rugged peaks of grey and red, with dashes of the greenest of vegetation, form all that is picturesque. In this setting are the homes or bungalows of the wealthier merchants and officials, with spacious grounds around each, all forming a splendid background for a thickly settled town that lies nestled at its base. But aside from all of this, there is the immense land locked body of water that floats sufficient shipping in course of a year to make Hong Kong the second place of importance in the world. Ships and steamers of all sizes and kinds are there, from the little junk to the big man-of-war. It was an object lesson in commercial extension to see the various flags on this fleet of merchantmen, and I am sorry to say, there were very few with our colors aloft.

Our Navy at Hong Kong.

Our Navy, however, was well represented, and the beautiful white squadron had been turned into sombre battle array. That same afternoon I watched them sail toward Manila and wished them every good luck.

It seems strange that so much commerce should pass through Hong Kong, for there is absolutely nothing raised or made on the island. Every thing they eat, wear or drink has to come from other countries. It is one tremendous clearance house, and is fortunate in being located in a geographical position favorable for exchange. It is a free port. All steamers that sail from East to West, or North to South, touch there. Huge cargoes are discharged from the big ocean steamers and sent to the small places in junks, and thousands of them make Hong Kong their headquarters.

It is the headquarters for drugs for the Empire of China, and two concerns act as main distributors, one of them having over 40 branches scattered all over the Empire, some being strictly Chinese shops.

No where in Africa, Australia or Asia have I seen as much of American drugs and patents, as in stores at Hong Kong. This can be attributed in a great measure to the fact of direct and frequent steamers. To be sure, when it comes to some of the fluid extracts, they can buy them cheaper in Germany or England, because the spirit tax regulations are more favorable in those countries for export.

Dewey at Manila.

It was my original plan to go over to Manila and see what could be done for Chamberlain's medicines, but under the circumstances, considered that I did not care to attack the town with life saving material. I preferred to let Admiral Dewey get in his work first.

From Hong Kong I visited Macao, a Portuguese possession 400 years old and as dead as it is old. I found two small drug stores and 40 gambling dens, but did no business at either—only stayed there a couple of days, and then came on to the wonderful city of Canton.

Canton.

Of all the towns I have ever visited or worked in, in a commercial capacity, my experiences here are the most startling and varied. It is a walled town that possesses no streets over eight feet wide and most are considerable narrower. It reminded me of one immense bazaar, for on each side of these narrow streets are shops of all kinds. It is one tremendous bee hive of humanity, all actively engaged in the struggle for existence, and the contrasts of wealth and poverty are seen as distinctly here as in any modern city. As I write to-night after a hard days work in the city, I feel as though I had had some hideous nightmare. My eyes seem to retain the panorama of strange sights. My ears are dulled by the hideous noises of the traffic. My sense of smell is ruined, for the odor that pervades the place must be experienced to be appreciated. Sewer gas is as attar of roses, com-

pared with it. Europeans, or as they call us, foreign devils, are not so common as to be unnoticed while traversing the streets. So it a positive necessity that one takes a guide and be carried in chairs. There is not such a thing as wheeled vehicles, and, if they did have them, the streets are too narrow and winding. To walk would be useless, for the passages are wet and slimy, and aside from this, the curiosity of the people would block the passages. It is when being carried through these narrow streets in a sedan chair by three coolies, who amble along at about a 5-miles an hour pace, that you realize what Canton is like. It is a big commercial center and all the stocks are carried by coolies, and hundreds jostle against you, loaded down with ponderous boxes and bales. The streets are crowded all the time and, as you dodge one of the many hanging signs, it may be only to strike against the offerings of some butcher shop, or like emporium. It is nothing uncommon to knock the hats from the heads of people with your chair, and generally some strong remarks are made.

Street Noises.

But the noise is something hideous. The coolies of your chair keep up a perpetual yell, warning people to get out of the way. The men loaded down with merchandise are howling like hyenas. The street vendors are in abundance, making known their wares at the top of their voices. Scores upon scores of beggars are crying for aid. Wedding parties, funeral processions, with their accompanying hideous music and explosion of fire crackers, shove your chair up against the side of some building when passing, or block you all together. Street musicians are common and really act as polite highwaymen—for when they stop in front of a store the merchant is only too glad to have them go away, and readily gives them a small mite.

The combination of colors, noises and odors, together with the position one occupies in a chair, gives a European a helpless sort of a feeling, and you wonder what under the sun all the people can do to live—but all seem busy, and, as a rule, have a healthy appearance, and are well formed.

When my little procession, consisting of the guide and his three bearers, and myself with similar outfit, stopped in front of a drug store, and I took my sample case in to show my wares, not only had I the attention of the proprietors, managers and clerks and coolies, but also that of the multitude in the streets.

In no time the streets would become blocked, and as many as could press into the store, came in to see what the "foreign devil" was about. The authorities, try as hard as they might, could not keep the streets open. You can imagine that this was rather distracting to myself and to the proprietor as well, for the mass was so dense that there was a danger of breaking cases and of theft. Try as hard as I could to sneak in, going even into back rooms or up stairs, had no effect, they hung around as though I had horns or was a freak escaped from some show. Those that gained a position near me would feel of my clothes, comment on my appearance—and not flattering always, criticize my hair, etc. But when they saw my sharp pointed shoes their bewilderment was complete.

Seeing that there was no chance to secure the proper attention or consideration on the part of the dealer, when so much confusion existed during my call, I changed my mode of operating, and thereafter simply called and left a card, asking them to call on me at the hotel in the European concession. This proved far more satisfactory to us all, and besides, I have had the pleasure in seeing some most gorgeous costumes worn by the dealers when calling. Their display of silks and brocades would drive an American lady half crazy through envy.

These merchants are very nice to meet, they are most polite and good business men, and can grasp a business proposition quickly. They are after business of any kind so long as it will return profits, and a very small per cent. satisfies them—"quick sales—small profits," is the prevailing motto.

A Chinese Drug Store.

A pure Chinese drug store is a sight, for they lay themselves out on elaborate interior decorations, using black woods, lacquers and gold for ornamentation. In

all the big stores they have a very large staff and seem to be busy, for they are continually manufacturing. A prescription clerk must be either a very highly educated individual or an awful ignoramus, for they fill prescriptions something on the same order a man sets type—take a little out of this box, some out of another, and it is not uncommon to put 30 or 40 ingredients into one mixture. In prescription work quantity seems to be the most important factor, and they tell me they must give a lot to satisfy the patients. It would puzzle some of our learned chemists to know in what combination to place scrapings from deer horns, or shark fins, snake skins, scales from the armadillo, etc.

Their pills resemble cannon balls, so immense are they in size. Some are supposed to be taken intact, others chewed. If I could swallow one of them, I would not work any more, but would go out and travel as a freak for sure.

Chinese Patent Medicines.

They are great on putting up patent medicines, which embraces a line far more varied than any price list one of our wholesale druggists would show. They do not beat around the bush when describing what this or that is for. Some times the complaint is made extra conspicuous by aid of drawings, and these same sketches are hung on the outer walls, so all can read who pass. Instead of calling the mixture after the name of the maker, they simply have a list of cures. For example, cure of sore eye, cure of cough, cure of stiff legs, and so on. Owing to the fact that the great masses in China have but little means, these local lines are put up in very small sizes. I saw bottles that retail for 2½ cents, and was offered a cure for unrequited affection, for 10 cents. But I did not buy, for so cheap an affection would surely be a job lot.

Chinese Doctors.

There are great many doctors and their profession is not a sinecure, for if a patient has medicines from a medical man, he not only wants a quantity but expects it to change his condition immediately, and it is nothing uncommon to have three or four different doctors in course of twenty-four hours. The medical men, knowing this, try and give them some red hot compound, that can be felt at once.

The superstition that pervades every class, is one of the many things that tend materially to keep China from advancing rapidly. Every shop has its joss and the proprietor seeks its advice before deciding any momentous question. And he abides by its decision. I met here a very learned gentleman, one who is a graduate of a good college in the United States, and asked him to accompany me to an inland village, but though he wanted to go, he would not make the trip simply because his joss said it was an inopportune time to leave home.

Chinese Quackery.

There are quacks in China as well as in other countries, and during a short visit I paid to the Temple of Horrors, I had ample opportunities to see how the masses are gulled. In this place are many small sections, showing mal-formations of the human body and life-size figures, picturing the punishment for violation of laws, human, national and religious. In front of these small sections would be some learned man, who, for a small consideration, would fix up your eyes, pull a tooth, reform your morals, or prognosticate your future. The place was crowded with humanity and it was a sight to see the look of reverence on the face of the patient as the learned man gave him instructions as to his complaint. The fortune tellers were doing a land office business.

Trade With China.

The demand here for American patents is not very great, but as the country develops it will improve. There are millions of people, who are each year having new wants, and these wants will be supplied, for the natives are making more money than in years gone by. Factories for the manufacture of silks and cotton are springing up at all the concession ports, giving them employment.

Here in China is one of the greatest fields for trade development in the world, though at the outset, it will not be so much in the drug line as in some of the other commodities, and people who are anxious to increase their

foreign trade will do well to have a look at this country. These tremendous rivers can, and do, act as means for reaching hundreds of miles of country inland. The spirit of railroad building is in the air, when they are here in fact, then will China become one of the greatest consuming countries in Asia. We must remember that John is slow to move and that the great bulk of the people are uneducated and far away from port towns. With the advent of railroads, there will be a commercial awakening and these new demands should be supplied by our country. It is the duty, not only of our Government, but also our manufacturers and our ship builders, to see that we have our proportion of this trade. It is ours by geographical position, we are nearer than any of the other competitors, excepting Japan. Countries on the Pacific Ocean in Asia are our natural territory and the bulk of the trade should be in our hands.

It is unfortunate that the Government here is held in such contempt by the masses. It is not so much the Emperor and his advisers at Peking, but the mandarins and under officials, who are much given to oppress and rob openly, who are responsible to-day for the prevailing opinion of the high and low, that money can and will do anything. They have no confidence in any one, and this was impressed most forcibly on me when making up an advertisement for a Chinese paper. I put in some testimonials, but the editor said they were no use, since every Chinaman who reads it would say: "How much did that man receive for that letter?"

Chinese Newspapers.

And mentioning Chinese papers in this connection, makes me remember, that this is also an interesting feature to us.

In an ordinary newspaper they have at least 4,000 different characters in type, and to the man who sets up the matter this means considerable work.

The type is arranged in boxes and placed in a semi-circle from the floor to as high as the ordinary individual can reach. The men are on their feet all the time, for every few minutes they may have to go the entire length of the room to find a character in some other circle, and the types are continually running around each other—it made me think of a walking match. Though they keep 4,000 characters made up, still there is a continual demand for some special one from the workmen, and this order is given to some men who take a blank and with a few dics of a sharp steel, turn out the desired character. The proprietor of one of the papers informed me, while going through his place, that very few of his type setters could read, that they simply set the matter from copy, without any idea what the matter was about.

Newspaper Advertising.

The best papers will not take an advertisement by the inch or line, but at so much per character an insertion, and want the money in advance. They will not, as a rule, give any position, but place each advertisement as it comes in to them in regular rotation after the reading matter, so gradually you are moved from one place to another, as new advertisements appear.

Aside from the commercial aspect of Canton, there is much to interest the sightseer, and I think I was more pleased with the life on the river than anything else. It is estimated that out of the 1,500,000 souls in Canton, at least 200,000 of them live in house boats, or as they call them, sampans. They are very small, yet you find families that have never lived elsewhere. They live and die in them, and during the day seek occupation by carrying passengers or cargoes. The woman seems to be the boss of the show, and to see them sailing the boat along, while strapped to their back is a baby, is a sight that would interest the modern woman. There is another class of boats, stern wheelers, that are propelled by human beings. It takes about 24 coolies in a team to move it along at a fair pace, and they carry many passengers to little towns up or down the river. At night time the river presents a gay appearance, for then the flower boats are illuminated. This is an institution peculiar to Canton. It is in these boats the Chinese entertain their friends with food and music. In each boat you and the flower girls, who are painted a very high color, and who have about as much expression on their faces as the picture of them on the china dishes. They are supposed to

add very much to the dinners, with their music, but what little I heard one night, when an old sampan woman was chaperoning me around, convinced me that a little of the music went a great ways. From the number of Chinese merchants and officials seen around these boats, I should judge that they take the place of the clubs in our country.

I have dwelt more on Canton than I had intended to, and in conclusion will state, that no description of the place can convey the correct impression. It must be seen and its odor inhaled, to thoroughly appreciate the city.

WILL A. PEAIRS.

PHARMACY.

TETRA-NITRO-CELLULOSE can be used for the preparation of colloid when it is rendered soluble. This is accomplished according to a process of Bronnert by adding calcium chloride to the solvent. The preparation so obtained is not readily inflammable, and is not subject to explosion from shocks. (Südd. Ap. Ztg.).

PREPARATION OF GAS.—A gas suitable for lighting, heating and for power is, according to a patent, obtained by treating a mixture of rosin and burnt lime with water, preferably acidulated. The illuminating power of the gas is increased by the addition of a certain proportion of calcium carbide, or a mixture of calcium carbide and magnesium carbonate. (Chem. Ztg.).

THEATRIN-JASPER is a new ointment vehicle, consisting of wax, oil and water, prepared by a new process not described. It is a soft, homogeneous, yellowish-white ointment, which keeps perfectly, takes up water to a fluid consistence and penetrates deep into the skin. It is particularly suitable for cosmetics, grease paints, etc. For medicinal purposes Jasper recommends such combinations as the following: Zinc oxide, 2 parts; theatrin, 18 parts. M. f. ung. Or. iodine, 0.1 part, potassium iodide, 1 part; water, sufficient for solution; theatrin, 20 parts. M. f. ung. (Ph. Post.).

SANGUINO TABLETS.—This preparation is claimed to contain all iron salts, albumins, fats and carbohydrates formed in the animal organism, in five times the quantity they are contained in the blood. The tablets are recommended for anemia, affections of the nerves and the heart, loss of appetite, scrofula and rachitis. They are agreeable to the taste and are well borne by weak stomachs. The preparation is also offered in liquid form, as "Hæmauridin Jauke," containing 70 per cent. of purified hæmoglobin, 20 per cent. of glycerin and 10 per cent. of cognac. (Ph. Post.).

QUININE CHLORO-CARBONATE is a compound intended to replace quinine. It is prepared by Zimmer & Co. in the following manner: Anhydrous quinine is subjected to the action of phosgene gas (carbon oxy-chloride), either as such or dissolved in benzol or toluol. A crystalline mass is formed, which is washed with benzol and then digested with water to remove quinine hydrochloride, which is also formed. Crystallized from alcohol the preparation is in delicate, colorless needles, melting at 187 to 188° C. The formula is $C_{10}H_{14}N_2O_5$. A distinct advantage in its use is a lack of bitter taste. (Südd. Ap. Ztg.).

PREPARATION OF IODINE-COMPOUNDS FROM THE THYROID GLAND.—Knoll & Co. have patented the following process: The gland or an extract prepared with water or a salt solution or the albumins obtained by the usual methods, are subjected to artificial digestion or to a treatment with dilute acids. The clear solution is then neutralized, which causes precipitation of a portion of the iodine present as an iodized acid-albumin. This is washed and dried. The remainder of the iodine is obtained from the filtrate, after concentration and purification of the residue, by the ordinary methods in form of a peptone. (Ap. Ztg.).

OXY-CAMPHOR is prepared from camphor-quinone by reduction in acid, neutral, or alkaline solution. By means of chromic acid it may be again oxidized to camphor-quinone. Oxy-camphor is soluble in water and melts at 196° to 198° C. It is intended for pharmaceutical uses. (Südd. Ap. Ztg.).

HAIRDYE.—The following formula is recommended in Pharm. Post: Pyrogallie acid, 4 parts; citric acid, 0.3 part; boroglycerin, 10 parts; distilled water, 90 parts. The mixture is brushed on the hair in the evening and the head washed with a weak solution of alkali the following morning.

INDUSTRIAL APPLICATIONS OF CARBON TETRACHLORIDE.—This substance, which a few years ago was prepared only in small quantities in the laboratory, is now manufactured in comparatively large quantities and at a sufficiently low price to make it available for many purposes. With increasing application the price will probably sink still lower. A great advantage in its use is its non-inflammability. It can therefore be warmed and distilled without the precautions required for benzine. Its solvent power for fats, oil, resins, etc., makes it useful for purposes of purification. As a solvent for dyestuffs and as an ingredient in varnishes it has found extensive application. It also dissolves rubber and nitrocellulose. (Drog. Ztg.).

MANUFACTURE OF AMMONIUM NITRATE.—A recently patented "wet" process is as follows: Calcium acid phosphate is first converted into ammonium phosphate by means of ammonium sulphate and ammonia. The ammonium phosphate is treated with Chili saltpetre (sodium nitrate), whereby ammonium nitrate and sodium phosphate are formed. The impure ammonium nitrate is purified first by treatment with ammonia and alcohol, and then with lime or calcium nitrate. The residual mixture of phosphates is treated with lime, and the ammonia it contains recovered by distillation. Sodium hydrate is obtained as a by-product. The precipitated calcium phosphate is treated with sulphuric acid, to regenerate the superphosphate, which is used over again. (Chem. Ztg.).

ADULTERATION OF VANILLIN WITH ACETANILID.—Dr. Hefelmann reports the examination of a sample of vanillin manufactured in Switzerland. Superficial examination with a magnifying glass showed the product to be a mixture of two kinds of crystals. While pure vanillin is completely soluble in dilute soda solution, this sample was only partially soluble. Acetanilid was isolated by removing the vanillin from an ethereal solution of the mixture by agitation with sodium bisulphite solution and evaporating the ether from the remaining solution of acetanilid. The residue responded to all reactions for this substance. It was found to be present to the extent of 27 per cent., calculated from the per cent of nitrogen found by the Kjeldahl method. (Ap. Ztg.).

EXAMINATION OF POWDERED DRUGS is frequently made difficult through presence of starch and albumen, which tend to cover up the cellular tissue. To remove this obstacle, Kinzel proposes the following method: 5 Gm. of the powdered drug are digested during 2 hours with 200 cc. of 1.5 per cent. sulphuric acid, washed well with water and then heated in a similar manner with 200 cc. of 1.5 per cent. sodium hydrate solution. After washing with water and alcohol the drug is subjected to the action of ether during ½ hour, and then dried. The residue is pure cellulose, which may be examined under the microscope for its structure. This method made it possible to detect 0.1 per cent. of ergot in bran, and may be used for approximate quantitative estimations of adulterations and impurities. (Ph. Post.)

COLORATION OF ANTISEPTIC SOLUTIONS.—For the prevention of accidents, sometimes caused by mistakes due to the use of colorless solutions, it is recommended in "Ztsch. f. Krankenpflege" to give each solution a distinctive color. The following are recommended: (1) Corrosive sublimate with methyl-violet, 1:20; malachite green, 1:100; (2) Nicholson blue, 1:100; indigo carmine, 1:100; (3) Phenol with fuchsin, 1:100; eosin, 1:100; safranin, 1:10; (3) Mercury oxycyanide with same colors as corrosive sub-

limate or with a saturated helianthin solution, 1:20; anilin orange, 1:20 or fluorescein, 1:20. (4) Silver nitrate with fluorescein. Solutions of such indifferent substances as boric acid, naphthol, etc., need not be colored. Copper sulphate, potassium permanganate, lysol, etc., are naturally colored. (Ap. Ztg.).

"SOD OIL" is a term applied to the oil which has been fuiled into skins during the operation of tanning, and has been subsequently washed out with soda. English sod oil comes chiefly from deer and sheep skins, and is largely adulterated with gelatine from green sheep skins. The purest and best sod oil is from France, where olive oil is employed in the tanning; the next is English, where cod oil has been used; then comes American, where the currying has been done with "fish oil" (menhaden oil). Sod oils are much esteemed for lubricating delicate mechanisms, etc. "Degras," or brown grease, is obtained from wool in the process of cleansing for manufacture. Sod oil, though sometimes made from fish oils, in the opinion of the General Appraisers at this port, is not in fact nor is it commercially known as a fish oil in the trade and commerce of this or (so far as known) any other country.

ointment of YELLOW MERCURIC OXIDE.—For the preparation of a smooth ointment containing the oxide in a very finely divided state, it has been recommended by several authors to employ a freshly prepared oxide, mixing it with the fats without previous drying. According to Dr. Fuchs this is unnecessary when the following method is used: 5 Gm. of mercuric oxide are triturated in a glass mortar with an equal quantity of white vaseline on a steam-bath, care being taken to keep the heat low. The object is to render the vaseline sufficiently fluid that it will always flow back into the middle of the mortar under the pestle. A very smooth ointment is so obtained in 20 to 25 minutes. After removal from the steam-bath 15 Gm. of vaseline are added and the trituration continued until the mixture is cold. This ointment contains 20 per cent. of mercuric oxide and may be kept on hand to prepare the weaker ointments when ordered. (Ther. Month., through Ap. Ztg.).

CRUDE GUTTA-PERCHA.—The article known in our commerce as crude gutta-percha is the inspissated milky juice or sap derived from certain trees, of the species *Dichopsis* (*Isanandra* Gutta), which grow wild in the Malay peninsula. Although the methods adopted by the Malays, Dyaks, and Chinese for extracting the gutta-percha and preparing for market vary considerably, they may be fairly summarized as follows: The trees are first felled with axes, and then incisions are made in the bark at distances of from 6 to 18 inches apart, to cause the flow of the milk or sap, which, as it exudes from the incisions, is caught in palm leaves, cocoanut shells, and other primitive vessels, but more or less escapes to the ground, which is gathered up along with sand and other particles. In instances the smaller quantities of this milk are inspissated or concreted by being rubbed in the hands. As a general rule, however, it is boiled in iron pans with the addition of various adulterants. Among these adulterants, other than the juices of allied plants, is cocoanut oil to improve the appearance, also lime juice which has the property of coagulating the gutta-percha immediately on ebullition. In Borneo some 20 per cent. of scraped bark is generally added, as it is said that the Chinese traders who purchase the article from the gatherers prefer it when containing this bark on account of the red color it imparts. This information is gleaned from an opinion rendered by General Appraiser Tichenor in a case where the decision of the Collector of Customs at this port as to the rate and amount of duties on certain so-called "crude gutta-percha" was protested, and in which the appraiser further states that the only "strictly crude" gutta-percha is the article in the fluid state in which it comes from the tree. It being impracticable, however, to preserve and market it in this condition, it is prepared and manipulated in the manner above stated for the purpose of transportation and market. The crude gutta-percha of commerce, therefore, has, as a rule, undergone a process of boiling, and contains impurities in varying percentages, which must be removed by expensive and difficult process in order that the gutta-percha itself may be profitably utilized.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Syrup of Fox's Lungs.

(B. P.) Syrup of fox's lungs is a very old preparation, no longer made from fox's lungs. MacEwan says that in England syrupus rheodas (syrup of red poppy, B. P.) is generally given nowadays, but there are diversions from this rule. Thus, in some places, syrup of tolu is given, in others syrup of squills, and even simple syrup colored with licorice. The syrup is used for the treatment of coughs, generally along with paregoric elixir. In Norwich, he says, the following mixture is given:

Licorice	2½ ounces
Dissolve in	
Water	5½ pints
Add	
Sugar	8 pounds
Dissolve by heating, strain through flannel, and	
Wine of ipecac.	4 ounces
Mix.	

Lotion for Sunburn.

(J. T. F.) The Era Formulary gives the following:

(1) Distilled water.....	5 ounces
Powdered borax.....	1 dram
Glycerine	2 ounce
Sodium sulphite.....	2 drams
Rose water, enough to make.....	10 ounces
(2) Citric acid.....	2 drams
Sulphate of iron.....	15 grains
Camphor	2 grains
Elder flower water.....	3 ounces
Orange flower water.....	13 ounces
Dissolve and filter. To the solution add	
Cologne water	2 drams
Tincture benzoin	1 ounce
(4) Zinc oxide	1 ounce
Borax	12 ounce
Glycerine	2 ounces
Extract of jasmine	1 ounce
Bay rum	3 ounces
Distilled water, enough to make.....	20 ounces

Pomegranate Syrup.

(H. T.) Hiss ("Manual of Beverages") gives the following:

Pomegranate juice.....	16 fl. ounces
Lemon juice.....	12 fl. ounce
Extract vanilla	12 fl. ounce
Syrup	16 fl. ounces
Soda foam	Sufficient.

It has also been recommended to prepare it (grenadine syrup) from grenadine essence by adding 5 fluidrams of the latter, 4 fluidrams of solution of citric acid and sufficient soda foam to enough syrup to make 32 fluid ounces. The formula for "grenadine" essence or extract follows:

Oil of cloves.....	6 drops
Oil of orange peel.....	15 drops
Tincture of ginger.....	1 fluidram
Vanilla extract	1½ fluidrams
Dilute phosphoric acid.....	4 fluidrams
Maraschino liqueur	2 fl. ounces
Tincture cochineal	2 fl. ounces
Distilled water	2 fl. ounces
Alcohol, enough to make.....	16 fl. ounces

Solution Iodide of Gold and Arsenic.

(A. C.) Try the following from Formulary of the Cincinnati Academy of Pharmacy:

Arsenous acid	28 grams
Iodine	50 grams
Gold triiodide	3.25 grams
Distilled water, a sufficient quantity to make.....	1000 cubic centimeters

Introduce the arsenous acid and the iodine into a

flask, and add 500 c. c. of distilled water; heat until the iodine has dissolved, being careful to avoid loss of iodine. Dissolve the triiodide of gold in this solution, transfer it to a porcelain capsule and heat over a water bath until free of iodine; cool, and add enough distilled water to make 1000 c. c. Ten minims of this solution contain 1-32 grain of triiodide of gold, and 1-32 grain of pentoxide of arsenic, or the equivalent of 1½ grain triiodide of arsenic.

A formula for solution bromide of gold and arsenic may be found in the National Formulary.

Dispensing Oils in Hard Capsules.

(C. T. B.) Ferte proposes the following method for dispensing oils, such as cubeb, sandal wood, etc., in the ordinary cylindrical hard gelatin capsules: Procure a well seasoned board, about 1 cm. thick, and make as many holes in it as the number of capsules you wish to fill at one time. It is a good idea to make holes to accommodate the different sizes of capsules in the same board. Nail a thinner board on one side, which is to be the bottom. Have the holes just large enough to hold the capsule without squeezing too hard. Put the empty capsules in the holes and proceed to fill them with the oil by means of a pipette, taking care to keep the oil from setting on the outside of the capsule. Do not fill the capsules too full. To seal, use a camel's hair pencil, and the following solution: Gelatin (Cox's), 10 grams; acacia, 50 grams; boric acid, 1 gram, and distilled water to make 100 c. c. of solution. This solution is to be heated to about 40° C. when using. The cover should be put on with a spiral motion, pressing gently.

Preserving Varnish Brushes.

(Paint Trade). An experienced master painter says the most inexpensive, and, taking everything into consideration, the best preserving liquid for varnish brushes is raw linseed oil. After pouring the desired quantity into the kepper, drop in just a little turpentine occasionally to keep the oil from fattening. It doesn't take much wiping to prepare the brush for use when it is taken from the kepper. The slight quantity of oil remaining in the tool will in no way harm the surface upon which it is used. The oil, if rightly looked after, will not need changing oftener than once a year, and it can then be put to use in the priming pot. On the other hand, varnish very soon begins to skin over, and when this tendency becomes apparent, trouble may be expected to ensue. The small atoms of congealed varnish insinuate themselves into the body of the brush, and are carried onto the work with results not at all pleasing to the varnisher. Brush-keeping varnish should be changed at least once a month, and that method, to a good many painters, would seem altogether too costly.

Hay Fever.

(N. S.) This disease is supposed to be due to stimulation of the mucous membrane of the nose and Schneiderian membrane by dust of hay, pollen of flowers, irritating vapors, etc. It is accompanied by much sneezing, lachrymation and nasal discharge. It is generally epidemic in June, July and August, during the period of efflorescence of plants. Some authorities insist that there is always a predisposing condition in the mucous membranes of the naso-respiratory tract in the form of chronic rhinitis. All sorts and methods of treatment have been advocated. The best results have been accomplished by a change of climate. Constant irrigation of the nostrils with warm water, with or without the addition of sodium bicarbonate application of weak solutions of cocaine hydrochlorate, arsenic taken internally, when the disease is more catarrhal than of the asthmatic type (Mackenzie), have all been recommended. Potassium iodide has been known to give speedy relief. For treatment you should consult a physician. A little work by W. C. Hollister, M. D. recently published by P. Blakiston's Son & Co., Philadelphia, will give you considerable information on the subject.

Colleges of Pharmacy Statistics.

(Student). There are about forty-five colleges and schools of pharmacy in the United States. According to the last report of the section on pharmaceutical education and legislation of the American Pharmaceutical Association, there were 4,698 students of pharmacy in these institutions, the number in each school ranging from 5 to 606. Eleven schools had less than 25 students, seven had between 25 and 50, nine had between 50 and 75, six had between 75 and 100, five had between 100 and 200, two between 200 and 300, and only one exceeded 400. Some of the best known and highest standard schools grant the one degree, "graduate in pharmacy." (Ph. G.); fifteen grant "pharmaceutical chemist." (Ph. C.); seven grant "doctor of pharmacy." (Phar. D. or P. D.); seven grant "bachelor of science in pharmacy." (B. S.); four grant "master in pharmacy." (Pharm. M.), and one "bachelor in pharmacy." (Phar. B.). The College of Pharmacy of the National Normal University, Lebanon, Ohio, confers the degree of "pharmacist and druggist." The number of graduates in pharmacy registered as pharmacists in the United States is estimated at 10,000, the total registration for 1896 being 61,600 registered pharmacists, and 10,487 registered assistant pharmacists. The number of pharmacists registered on diploma for the same year was 331.

Self-Shaving or Depilatory Soap.

(W. G. W.) The following has been published:

- (a) Powdered wheat starch..... 120 parts
Water..... 120 parts
(b) Sodium sulphide..... 34 parts
Barium sulphide..... 30 parts
Water..... 180 parts
(c) Palm oil..... 30 parts
Glycerine..... 21 parts

Dissolve the powdered starch in 120 parts of tepid water in one vessel and set aside for use when wanted (a). In a second vessel dissolve the sodium sulphide (crystals), and stir it and the barium sulphide in the 180 parts of water (b); add the glycerine. In another separate vessel melt the palm oil.

To mix the compounds, make the sulphide solution (b) boiling hot, stir up the starch solution (a) and then gradually stir it into the sulphide solution (b); keep stirring until the starch thickens; add the melted palm oil, mix all well together and add the perfume (citronella essence, mirbane or oil of lavender, etc.). Before the mass cools and congeals pour it into porcelain pots or wide-mouthed bottles. Directions for use: Rub the soap into the hair to be removed until the hair loses its crispness and filamentous form, and becomes a pulpy mass; then wash the part well with water and the hair will all be removed. Should the skin smart after applying the soap rub in a little olive oil or vaseline.

Paste for Mounting Photographs.

(P. A. L.) Here are several formulas:

- (1) Nelson's No. 1 photo gelatine..... 4 ounces
Water..... 16 ounces
Soak, dissolve on a water-bath, and add when somewhat cooled:

Glycerine..... 1 ounce
Methylated spirit..... 5 ounces

Mix.

- (2) Arrowroot..... 10 parts
Water..... 100 parts
Gelatine..... 1 part
Alcohol..... 10 parts

Soak the gelatine in the water, add the arrowroot, which has been thoroughly mixed with a small quantity of the water, and boil four or five minutes. After cooling, add the alcohol and a few drops of carbolic acid or oil of cloves.

- (3) Best Bermuda arrowroot..... 1½ ounces
Sheet gelatine or best Russian glue..... 80 grains
Water..... 15 ounces
Methylated spirit..... 1 ounce

In a small pan mix the arrowroot thoroughly with 1 ounce of water until the mixture becomes like thick cream; then add 14 ounces of water and the gelatine broken into small fragments. Roll for four or five

minutes, set the mixture aside until partially cold, then add the methylated spirit and about 6 drops of carbolic acid. The methylated spirit should be added in a gentle stream, the mixture being stirred rapidly all the time. Keep it in a corked stock bottle, and take out as much as may be required for the time, and work it up nicely with the brush.

(4). The following has been suggested as a very desirable substitute for the ordinary pastes used for mounting photographic prints. It is said it can be used so as to scarcely swell the paper at all, avoiding the objectionable cockling so much complained of:

Thick, well boiled, clear starch (corn) paste.....	1 pound
Glucose syrup ("A" clear).....	7 ounces
White curd soap.....	½ ounce
Dextrine.....	5 ounces
Borax.....	1 ounce
Clove oil.....	A few drops.

All are heated over the water bath, and thinned down to a proper consistence (if thin paste is required), with fresh skimmed milk. It is advisable to use the paste warm, and as thick as possible.

Poultry Food.

(E. D. S.) "Pharmaceutical Formulas" is authority for the following:

- (1) Ground bones..... 4 ounces
Ferrous sulphate..... ½ ounce
Capsicum..... ½ ounce
Fenugreek..... ½ ounce
Black pepper..... ½ ounce
Sodium sulphate..... 1 ounce
Silver sand..... 2 ounces
Ground dog biscuits..... 8 ounces
(2) Beef (lean, dried and ground)..... 20 ounces
Linsed cake..... 25 ounces
Indian corn..... 20 ounces
Indian corn (slightly browned with lard)..... 2 ounces
Ground oyster shells..... 10 ounces
Chalk..... 6 ounces
Magnesia..... 2 ounces
Silver sand..... 2 ounces
Ground bones..... 2 ounces
Mustard bran..... 3 ounces
Capsicums..... 2 ounces
Common salt..... 2 ounces
Iron sulphate..... 1 ounce
Sodium carbonate..... 1 ounce
Sulphur..... 1 ounce

Mix. A heaped teaspoonful of either of these is to be mixed with the food for twenty fowls.

The following is a formula for an "egg-producing spice."

Powdered licorice.....	6 ounces
Powdered gentian.....	1 dram
Powdered capsicum.....	1 dram
Powdered fenugreek.....	2 ounces

Mix. One teaspoonful for eight to ten full-grown fowls, to be given three to five times a week with the morning meal.

PREPARATION OF TROPON. (Finckler's so-called artificial albumen.)—According to the patent the "process for obtaining albuminous substances from animal and vegetable products" is as follows: The crude materials are boiled with hydrogen dioxide solution, which so changes the constituents of unpleasant taste and odor that they may be removed by washing with water, alcohol, ether, benzoin, etc. In place of hydrogen dioxide other substances may be used to advantage, as chlorates, chloric acid, phosphoric or phosphorous acid, or dilute alkali solutions. If, for example, hacked meat is heated with 30 times its weight of a 0.1 per cent. soda solution until liquefied, and the solution neutralized, the albumen is entirely precipitated, while fat, odorous substances, etc., are saponified or rendered soluble. After washing, the result is an odorless and tasteless residue, which consists of 95 per cent. of albumen and 5 per cent. of water. (Ph. Post.).

AN EFFECTIVE CURE FOR HEADACHE is said to be the following combination: Quinine valerianate, 1 Gm. (15 grains); caffeine citrate, 0.5 Gm. (8 grains); extract of cannabis indica, 0.1 Gm. (1½ grain). Make into 10 pills. Dose, 2 to 3 pills daily. (Ap. Ztc.).

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XX.

NEW YORK, AUGUST 4, 1898.

No. 5.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York.
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

	PAGE.		PAGE.
EDITORIAL	135	Department Stores: Patent on Antidotoxin.....	153
CORRESPONDENCE	138	More Castoria Suits; Do Other Cities Know This Man	154
ORIGINAL AND SELECTED PAPERS:		Tufts' Prize Essay Contest: Phenacetin at U. S. Marshal's Sale; League for Shorter Hours.....	155
A Table of Atomic Weights	139	NEWS LETTERS.....	155
Pharmacy in Belgium.....	142	New Books.....	161
Pests and Poisonous Creatures Peculiar to Cuba and the Philippines.....	144	BUSINESS RECORD.....	162
PHARMACY	146	Associations	162
QUESTION BOX.....	148	Boards	163
NEWS AND TRADE DEPARTMENT	151	OBITUARY	163
Final Rulings on Pharmaceuticals	151	DRUGGISTS ADVERTISING	164
Better Supply of Stamps.....	152	PATENTS, ETC.....	166
Raised His Prices Then Lowered Them; Pittsburgh Druggists to Fight	152	STATE OF TRADE.....	167
		MARKET REPORTS.....	168

NOTICE TO ERA COURSE STUDENTS.

ERA COURSE IN PHARMACY.

During the next term of the Era Course in Pharmacy, beginning Sept. 1, 1898, two classes, Junior and Senior, will pursue their studies simultaneously and lectures for each class will appear weekly in the Pharmaceutical Era. Students of the Junior year just completed who pass the examinations will be admitted to the Senior Class, but new students who desire to join the Senior Class without first pursuing the Junior year's studies will be allowed to do so only after passing an examination. Those who desire to join the Senior Class under such conditions should communicate at once with the Director of the Course, J. H. Beal, Scio, Ohio, so that the examination may be concluded and matriculation be properly attended to before the opening of the course.

No restrictions are imposed for entrance to the Junior Class.

A complete prospectus giving full details regarding the course will be mailed upon application.

Address

THE PHARMACEUTICAL ERA,

A Decision Which Doesn't Decide.

The decision of the Commissioner of Internal Revenue upon the taxability of pharmaceuticals is given elsewhere in this issue. It relieves the situation somewhat, clears up a few points and reverses a few ill-considered previous rulings, but it is, as a whole, a disappointment, and falls short of the anticipations of the manufacturers. Aside from a few commissioner's decisions, which do not seem to be entirely justified, the trouble seems to be with the law itself. In spreading the legal net to catch all medicinal proprietary preparations, the authors of the law were not aware of the many shades of distinction which are recognized within the trade, and in applying the views and distinctions of outsiders the drug trade finds itself helplessly confused.

Even if the Commissioner has interpreted the law, the average reader of his decision will possibly be possessed with harrowing thought and doubt in his endeavor to interpret the Commissioner.

The rule for determining when a medicine resembles a proprietary, by its looks, has an inflexibility suggestive of the Medes and Persians. If "the package, bottle, carton, wrapper, label, bottle or container resembles in one or more particulars any make or brand of patent, trade-mark or proprietary medicine in general," that settles it—stamp! It will be hard indeed to find a pharmaceutical preparation which does not in one or more particulars resemble any make or brand of patent, trade-mark or proprietary medicine.

The use of a trade-mark or the name of the maker or other person in the possessive case before the name of a medicine or any name immediately following, makes the medicine taxable. An exception to this grants the use of the name of the author of a formula immediately following the name of a medicine, and the manufacturer may blow his name in the bottle or print it inconspicuously upon the wrapper.

It will be remembered that a previous ruling by the Commissioner read as follows: "Any medicinal article will be held to be advertised on the package or otherwise as remedies or specific for any ailment if there is any statement whatever upon any part of the article of any 'disease or affection whatever of the human or animal body,' for which the contents should or might be used, or if the title is such as to imply the value of the article as a remedy for any disease, or as having any particular effect upon the system, such as 'carminative lozenges,' 'anthelmintic tablets,' 'laxative elixir,' etc." The latter part of this ruling was what was most seriously objected to, and in the revised ruling the words "or if the title" and what follows have been dropped and the following put in their place: "This shall not be construed, however, as prohibiting the printing of the formula and the dose on the label, or words indicating the therapeutic action of the medicine in purely technical language not in common use."

Whether this allows the use of "laxative elixir," "anthelmintic tablets," etc., is, we presume, to be

dependent upon the view whether these are purely technical words and not in common use. There seems to be need for an "Index Expurgatorius" of unallowable medical names in common use.

Any pharmaceutical which is advertised to have peculiar merit or value over other like articles or other articles of the same class must be stamped, the exception in this case being in the use of those words intended to define the grade of an article, like "chemically pure," or the manner of its manufacture when such manner is well known and established, as "granulated," "pressed," etc.

What Is the Era Course and How Conducted?

The Era Course in Pharmacy consists of a series of lectures, two or more of which are printed each week in the Pharmaceutical Era, and extending over a period of two years, each consisting of nine months, or thirty-six weeks, exclusive of vacations. The first, or Junior Year, is occupied mainly with chemistry, pharmaceutical physics, microscopy, botany, pharmacognosy, pharmaceutical processes and other similar preparatory branches which qualify the student for the study of technical pharmacy. The second, or Senior Year, is devoted principally to subjects bearing directly upon practical pharmacy, such as materia medica, the study of the Pharmacopoeia, pharmaceutical preparations, official chemical substances, prescriptions, dispensing, etc.

Periodically, every student enrolled in the course receives by mail printed questions which are answered upon recitation blanks furnished for that purpose, and returned to the director's office. Here they are given into the hands of competent quiz masters, who carefully read the recitations, correct errors, criticize imperfect answers, explain knotty or obscure points, and return the papers so corrected to the student, while the grades are entered upon the records.

At the end of the Fall Term an examination is held upon all the branches of the term, and at the close of the Spring Term another upon the entire year. Students of the Junior Year who make a sufficient grade are promoted to the Senior Class, while those of the latter class who attain a sufficiently high scholarship receive a handsomely engraved diploma, showing that they have successfully completed the course, and have graduated therefrom.

The fees charged students for the advantages of the course are but little more than nominal, and are for the purpose of defraying the expenses of the director's office, such as postage, the payment of quiz masters, the cost of printing the recitation and examination papers, etc.

The character of the lectures is best comprehended from an inspection of the list of contributors to the course, which includes the best known practitioners and educators in the world of pharmacy, so that the subject receives treatment from the strictly scientific standpoint, by those who have made this feature of pharmacy their life work, and from the practical standpoint by men who, in giving advice to the student of the Course, are simply relating their personal experience of the measures and instrumentalities through which they have themselves achieved success.

In addition to the lectures upon the subjects named in the curriculum and upon which recitations are regularly held, numerous other lectures are printed from time to time upon important collateral topics of interest, either to the theoretical or business side of pharmacy.

An interesting and valuable feature of the Era Course are the practical studies which accompany

the lectures upon nearly every subject. These consist of carefully devised directions for the performance of experiments, illustrating the general laws and fundamental facts of nature, by means of such simple appliances and common pieces of apparatus as are available almost anywhere. The exercises are so prepared that, while sufficiently plain and simple to enable the student to proceed intelligently, they do not deprive him of the pleasure of the investigation by telling him in advance what the result of each experiment is to be, but leave him to determine the latter for himself, thus cultivating his powers of observation as well as storing his memory.

By means of the practical studies, properly carried out, it is possible for the student to obtain many of the advantages of practical laboratory courses at extremely small expense.

In the case of such subjects as Botany, Pharmacognosy and Materia Medica, instructions are given for the preparation of the specimens necessary for their proper illustration.

Some Queer Figures.

Ordinarily a work like the Era Druggists' Directory cannot be recommended for steady reading during warm weather. But, nevertheless, the person whose imagination is unimpaired might enjoy a romance of facts and figures drawn from the book. For instance, the book shows that there are 284 jobbing or wholesale druggists in the United States. Now the lines dividing the different States of this country are not formidable affairs, interposing barriers to trade and travel, but if they were, if the jobbers of each State were restricted to the State in which they are located, some astonishing things might happen. Thus, if all the people in New Jersey were compelled to purchase goods of the one jobbing firm in that State, that firm would enjoy the patronage of 1,444,933 people, while the thirty jobbers of New York State, with its 6,000,000 population, would each have about 200,000 people for customers. North Carolina comes next to New Jersey on the list, with about 800,000 apiece for its two jobbers, and from these figures the drop is down to 500,000 and less.

Separating the States into groups, showing the population to each firm, the list would be something like this:

Between 400,000 and 500,000 people to each firm: Kansas, Michigan and Mississippi.

Between 300,000 and 400,000 to each firm: Kentucky, Illinois, Florida, Nebraska, Oregon, South Carolina, Texas, Vermont.

Between 250,000 and 300,000: Alabama, Arkansas, District of Columbia, Missouri, Minnesota, Ohio, Wisconsin.

Between 200,000 and 250,000: Colorado, Indiana, Louisiana, Massachusetts, New York, Pennsylvania, Tennessee.

Between 150,000 and 200,000: California, Georgia, New Hampshire, New Mexico, Virginia, Washington, West Virginia.

Between 100,000 and 150,000: Iowa, Maine, Rhode Island.

Less than 100,000: Connecticut, Delaware, Maryland, Montana, Utah.

Applying the same fanciful restriction to the jobbers by cities shows equally curious results. Assuming that the jobbers of the several cities were restricted to their respective cities for customers, the cities would be arranged as follows, to show approximately the population for each jobber: Buffalo, 335,000; Washington, D. C., 229,000; Newark, N. J., 220,000; Chicago, 200,000; Greater New York, 200,000; Minneapolis, 164,000; Denver, 130,000; Cleveland,

130,000; Detroit, 120,000; St. Louis, 113,000; Albany, 97,000; Philadelphia, 95,000; Springfield, Mass., 84,000; Scranton, Pa., 83,000; Des Moines, Ia., 87,000; Toledo, O., 81,000; Pittsburg, 79,000; Cincinnati, 75,000; San Francisco, 75,000; Portland, Ore., 70,000; Reading, Pa., 70,000; St. Paul, Minn., 63,000; Dayton, O., 61,000; Kansas City, 61,000; New Orleans, 60,000; Lincoln, Neb., 55,000; Boston, 55,000; St. Joseph, Mo., 52,000; Syracuse, N. Y., 50,000.

There are quite a large number of jobbing firms making a good living in smaller cities, which by the above system of restriction would show that their available customers are less than 50,000 people. But the foregoing figures need not worry any one concerned; the showing is simply a mathematical romance for warm weather consumption.

A Hundred Years of the Metric System.

Recent news dispatches record that preparations are already being made for a celebration next Summer of the hundredth anniversary of the eventful date when a committee of scientific men placed before the French Government the meter and kilogramme as standards of measures and weights.

It is interesting at this time to go back to the most inflammatory period of the French Revolution for a few of the details which signalized the establishment of the new system, which, to use the words of a writer in a Brussels geographical publication, "in a hundred years has conquered the world." This statement may or may not be true, but there is no doubt of the growing tendency to adopt the metric weights and measures throughout the civilized world; indeed, the system has been established in nearly every country in Europe except England, and even there, as in this country, it has become legalized, along with other systems.

The nomenclature of the metric system was established by decree of the French National Convention, April 7, 1795, although the meter and the kilogramme were only provisional and not definitive. On April 17 of the same year a commission consisting of twelve persons, Berthollet, Borda, Brisson, Coulomb, Delambre, Haüy, Lagrange, La Place, Mechain, Monge, Prony and Vandemonde, was appointed to work out to completion the details of the plan which had previously been proposed. The most important and laborious part of the work was the measurement of the arc of the meridian, a duty begun by Delambre and Mechain. Their reports and those of a committee of the National Institute were consolidated and presented "with all suitable solemnity" to the two branches of the National Assembly of France, June 22, 1799, together with a definitive meter of platinum, made by Lenoir, and a kilogramme of the same metal, made by Fortin. History tells us the reports were introduced by an appropriate address at the bar of the two houses by the presiding member of the Institute, La Place. On the same day the standard meter and kilogramme were deposited in the hands of the keeper of the public archives, and a record of the fact was made and signed by him, and by all the members of the Institute, foreign associates and artists, whose joint labors had contributed to the consummation of the undertaking.

The details of this memorable spectacle are admirably set forth in a Report upon Weights and Measures, prepared by John Quincy Adams, Secretary of State, in conformity to a resolution of the United States Senate, March 3, 1817. To him the "scene formed an epocha in the history of man. It was an example and an admonition to the legislators of every nation, and of all after times." His report

closes with these prophetic words: "France first surveyed the subject of weights and measures in all its extent and all its compass. The glory of the first attempt belongs to her. France first beheld it as involving the interests, the comforts and the morals of all nations and of all after ages. In forming her system, she acted as the representative of the whole human race, present and to come. She has established it by law within her own territories; and she has offered it as a benefaction to the acceptance of all other nations. That it is worthy of their acceptance, is believed to be beyond question. But opinion is the queen of the world; and the final prevalence of this system beyond the boundaries of France's power must await the time when the example of its benefits, long and practically enjoyed, shall acquire the ascendancy over the opinions of other nations which gives motion to the springs and direction to the wheels of power."

The prophecy of this great statesman has been in part fulfilled. Over 500,000,000 of the earth's population, it is estimated, reside in countries where the system is obligatory by law. Millions of the peoples of the two great branches of the Anglo-Saxon race, Great Britain and the United States, are permitted to barter and enjoy its benefits as under other legalized standards. Already the strongest argument in favor of the metric system, to the exclusion of every other, is the international one, drawn from its use by so large a portion of the civilized world. We are a commercial nation, and to-day we are standing at the parting of the ways. Commerce, exchange and time-saving computations demand its greater use by our countrymen, and he who stands aloof from its adoption violates his obligation to his country and to humanity. The question now is, will territorial expansion, which gives to us immeasurable prospects for trade and commerce in the twentieth century, bring to us the exclusive use of the metric system!

A Burden To the Memory.

Our esteemed contemporary, the Western Druggist, in a moment of solitude for the druggist in his brain-fagging struggle with the stamp tax, says: "Not to burden the memory unnecessarily, it may be well to remember that the new tax on proprietary articles is one-eighth of a cent for each five cents of retail value."

There is danger that the person who burdens his memory with this rule will run foul of the Internal Revenue Department. The tax is not invariably one-eighth of a cent for each five cents of retail value. Our contemporary should have told its readers to post up or carry for ready reference the table of rates published in the Era of July 14.

Who said druggists are not patriotic? As a matter of fact they are about the most patriotic class of citizens and have contributed more than their quota to Uncle Sam's fighting forces, not to mention hospital stewards, apothecaries, ambulance corps, etc. Further than this, here comes an Illinois druggist who has invented a solution by which lead bullets may be hardened, and he wants the Army and Navy authorities to make liberal use of this invention in subduing the haughty Dons. Possibly he wants pay for the invention, but it is not so stated. He has been instructed to prepare cartridges of the size now in use, to be experimented with by the Government officials.

The American Grocer says this:

It is feasible for the Legislature to make it a criminal offense to sell any proprietary article below a minimum price to be fixed by the manufacturer, whose ownership of a trade-mark article gives him control of it until its identity is lost.

Correspondence

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

ABOLISH THE QUANTITY PRICE.

Wellsboro, Pa., July 23, 1898.

To the Editor:—We have read with interest the letters from your subscribers on the War Tax and who should stand the expense of it. It was evidently the intention of the law-makers to have the manufacturers of proprietary articles bear the burden of the tax. I don't suppose there was one member in Congress who thought the manufacturers would profit by it. They are the ones who are making a profit from their goods, are selling an article at a fictitious value, five or six times the first cost of their goods; they are the ones who should stand the tax. It is true, they may spend their profits advertising, or by expensive management; but no doubt one item of advertising, if cut off, would pay their revenue stamps. And the firm who stands this tax will receive from the druggist a preference which I believe will more than make up for the dropping of a few advertisements.

The druggist can discourage the sale of a patent and practically discontinue it from his sales. I believe the manufacturers are working their own ruin, and that they will begin to realize it more as the druggists become better educated and better organized. The intelligent druggist is to-day looked upon as more than an ordinary store-keeper.

A lady from Brooklyn once said to me, "we think as much of our druggist as we do of our doctor, and he stands to us in the same position. We have confidence in what he tells us."

The druggists in Wellsboro agree to discourage the sale of all high-price patents, and to drop some from our stocks entirely. The druggists in small towns cannot sell medicines at less than grocerymen's profits.

It is disgusting to read the circulars sent out by proprietors, giving their different reasons for advancing prices. In most cases they advise the druggists that by buying their goods in quantities the discount brings it to nearly the old prices. Why does the manufacturer want the retailer to buy his preparations in such large quantities? They must think every retail druggist is a millionaire, and can buy fifty or one hundred dollars worth of every patent nostrum on the market. The druggist would need a store as big as an arsenal and capital unlimited. And I wish to say that right here is the cause of cutting in retail prices, which the proprietors say they are anxious to prevent. For an illustration, the circular issued by the _____ Co., to protect the retailer, says: "Buy our goods and pay \$9.00 per dozen. Sell them six for \$5, and make 20 cents profit, or 4 per cent. on the sale." Now think of living and paying expenses on 4 per cent. profit on the sales of a drug store. They further say: "Buy our goods in dozen lots and get 25 cents rebate, after you have bought \$20 worth. Buy them in \$10 lots and get an extra 5 per cent. Buy in larger lots and get a larger discount." Now here is the trouble. The cutter is generally a man with more money than the ordinary retail druggist, but it is not to be supposed that he made it in the drug business. He sees here a chance to do a stroke of advertising. The reasons: "I can buy \$100 or \$200 worth of _____ and _____ and sell them cheaper than the druggists can buy them. I think I will do it." And the plan which the _____ Company have studded out to protect the retailers and enlarge their own profits has the opposite effect. If the manufacturers would sell only to the jobbers and allow them a fair profit for handling their goods; do away with the quantity prices, which in no way helps the retail sale of their goods, the temptation to cut would be much lessened. The quantity price is also unfair to the jobber. It reduces his profits, and he has to sell an article oftentimes for what he pays for it. Do away with the quantity price, allow the retailer and the jobber a fair profit for handling their goods, and the war between the proprietors and the druggists will stop.

S. A. CAMPBELL, of Blatchley & Campbell.

KEEP THE BALL ROLLING.

Litchfield, Ill., July 25, 1898.

To the Editor:—In reply to our brother druggists and the Oklahoma Pharmaceutical Association, we wish to express our approval and sincere thanks for their loyalty and patriotic resolutions against the unjust advance in patent medicines. An estimate of the advance shows that it is from 5 to 12½ per cent., averaging about 10 per cent., the advance on the 25-cent preparations being from 25 to 50 cents per dozen. What does this mean to the retail druggist? First: We pay a war tax of 2½ per cent. Second: A profit to the manufacturer of 7½ per cent. Third: It costs the druggist from \$12 to \$18 per month. To prove this, pick out ten of your staple patents, and add the old price and then the new, and see the per cent. advance. Your daily sales will tell the rest. I would suggest and urge that every druggist write a personal letter to his State Pharmaceutical Association, asking them to pass resolutions similar to our brother Oklahoma association, and do likewise. Keep the ball rolling!

E. E. STEVENS.

WILL NOT HANDLE THEM.

Marble Falls, Texas, July 25, 1898.

To the Editor:—Rab for the Era for the interest it has taken in the war tax. We have just written twenty-three manufacturers, who have not advanced prices, to send advertising matter. Their goods will be encouraged in every way possible. We have refused several requests for names from houses who advanced prices. No advertisement for goods over \$2, \$4 and \$8 leaves this store. Though little we are with you, Pittsburg, Newark, Muncie, Wooster, Fort Dodge, Wheeling, Oklahoma, "far off" Dallas, etc. We are of the opinion that if the money spent for circulars giving new prices, etc., had been invested in war stamps, the manufacturers would have done a better deed for themselves and the country.

E. G. MICHEL.

HE SAYS SO TOO.

Iowa City, Iowa, July 30, 1898.

To the Editor:—Mr. Pfeiffer's article in last week's Era hits the spot, "Put the Spanish Flag on Them."

Just after reading the article, a customer came in and asked for a bottle of sarsaparilla. I asked whose make. His reply was, "I hardly know." I handed down Ayer's and then Hood's. He noticed the revenue stamp, and remarked that it was the first he had seen. I told him Ayer refused to pay his stamp tax unless the druggist paid him between 5 and 6 cents above the stamp for placing it there, and Hood pays his tax. He was not long in deciding which to take. Yes, I say, put the Spanish flag on all who will not pay one-half the stamp tax.

M. W. DAVIS.

A Cleveland druggist has been indicted by the Grand Jury charged with selling poison to a minor. It is related that a couple of little children purchased from this druggist five cents' worth of carbolic acid, stating that it was for their father. They gave it, however, to a thirteen-year-old sister, who swallowed it and died. The offense of selling poison to a minor in Ohio is punishable by twenty days' imprisonment, and from \$20 to \$200 fine. It hardly seems that this penalty is severe enough if the present instance of gross carelessness and disregard of professional duty is at all indicative of the general state of affairs in this respect in Ohio.

Newspapers state that some Cleveland druggists have decided that it would be bad policy to fight the wholesalers and manufacturers who have made such unreasonable advances in the prices of patent medicines because of the stamp tax. Nor do they believe they can charge the customer more for these goods. So to even up matters a little, they propose to increase the prices of prescriptions some 10 or 15 per cent. The scheme is possibly all right in theory, but doubt is expressed that it will work in practice, now that the papers have told the public all about it.

A TABLE OF ATOMIC WEIGHTS.¹

BY THEODORE WILLIAM RICHARDS.

Since no natural constants are more used by chemists than the atomic weights, it is a matter of great importance for every one, from the chemical philosopher to the practical analyst, to have a convenient table of them always at hand. Unfortunately, the present state of our science makes the selection of the values often a matter of personal opinion; and because this is the case, it is well that many of those who have had experience in accurate quantitative analysis should express their views. Hence arose the present work, which was begun solely for use in Harvard College.

It is true that an accurate table of atomic weights may sometimes be less appropriate for the calculation of analyses than an inaccurate one, for the constant errors of any one process are eliminated as much as possible from the accurate table, and, moreover, all the results are reduced to the vacuum standard. Of course neither of these refinements is to be expected in common work, although many uncorrected methods may yield results which are very consistent among themselves. Obviously the best table for the practical calculation of analyses would be a list of factors in which each quantity had been found empirically according to precisely the method which is to be employed in the analysis of an unknown substance.² Since, however, the errors of ordinary work often eliminate one another, and since such a table of empirical factors would have to be accompanied by exceedingly minute directions, the scientifically accurate table of atomic weights is generally the most convenient substitute for the factors demanded by the analyst, as well as the most suitable basis for theoretical considerations concerning the periodic system of the elements.

In the compilation of the following table the chief emphasis has been laid on the probable chemical accuracy of the processes involved in each case. The search for possible causes of constant chemical error has usually furnished the evidence, if any evidence was to be obtained, upon which has been based the sometimes very puzzling decisions between conflicting data. For example, the possible occlusion of foreign matters by many precipitates has always been borne in mind, as well as the fact that crystals obtained from aqueous solutions usually retain with great obstinacy important amounts of mother liquor enclosed within their structure. Oxides and other substances contained by ignition often have a tendency to occlude traces of other materials remaining from their mother compounds; of course the possibilities of such a serious error must be carefully weighed in each case. Most experimenters upon the volumetric ratio of silver to the chlorides have produced erroneous data, through lack of knowledge of the dangers of this apparently simple process. These results must then be given small weight, no matter how concordant they may seem. The solubility of glass and porcelain, as well as nearly all precipitates, is another frequently overlooked source of grave complications, and so is the action of many substances upon their containing vessels at high temperatures. The fact that in some cases the necessary methods of calculation greatly magnify the experimental error was not forgotten. These and many other equally obvious minor principles have served as the guides in the selection of the figures below; but of course the results cannot be considered ultimate. "Post-mortem examinations are often unable to detect the more subtle poisons." In many cases much more experimental work is needed, not only to secure new data, but also to show where the old are in error. While, however, it is very important to show such falsity, the attempt to counteract it numerically by the application of small corrections, is a dangerous remedy; for minor conditions often seriously modify the minor corrections. In such cases wholly new data must usually be obtained, and these must be corrected, if correction is necessary, by him who is familiar with every step of the processes involved.

One is continually reminded, as he studies the conflicting evidence of the words of Ostwald: "Differenzen sind nicht selten, und mahnen ernstlich an die Unvollkommenheit menschlicher Arbeit, aber auch an die

Verantwortung, welcher jeder übernimmt, welcher einen numerischen Wert der Öffentlichkeit mitteilt."³ This responsibility is not always realized by eager investigators, who seek to make up for a possible lack of quality by a superabundance of quantity. "A single determination, well worked out, is better than twenty incomplete ones. Too much cannot be said against the multiplication of incomplete or carelessly obtained data; for such data carry with them not only uncertainty and confusion in the present, but also additional labor for a reviser in the future." Every reaction must be assumed to involve some constant error, and every substance must be assumed to contain some constant impurity, until a proof of the contrary is obtained. Our woefully discordant data furnished a heavy presumption against almost any chemical method, when greater accuracy than one part in four or five hundred is desired.

The standard $O = 16.000$ is adopted below, as likely to be the most convenient for many years to come.⁴ The last figure of each number given in the following table cannot be considered in any case certain. It is often probably not much more than one unit in error, although the uncertainty may amount to as much as six or eight units in some cases. Of course the decimal notation does not admit of closer indications without an individual explanation in each case. For example: iron, gallium and germanium are given in the table as 56.0, 70.0 and 72.5 respectively. The first is probably known within 0.1 or 0.2, while the other two may easily be 0.5 in error; but the method of expressing the results does not admit of this grade of distinction.

The aim has been to construct a convenient working table, which shall carry with it all that is trustworthy and nothing that is unnecessary. It is almost needless to state that the well-known standard works of Clarke, Meyer and Seubert, Ostwald, Van der Plaats, and others, have been freely consulted in the preparation of this table, as well as many of the original papers.

Especially am I indebted to Professor Clarke for his latest gigantic collection of data and results,⁵ which would have made the present table a work of supererogation, if he had viewed the subject from a somewhat less mathematical standpoint. Professor Clarke's method of decision places the credit with the skillful manipulator; I have striven to give the thoughtful chemist who is not so clever with his hands the credit which I think belongs to him. The fact that the two tables usually agree is due either to the best methods having fallen into the best hands; or to Prof. Clarke's having wisely forsaken the rigid application of his principle; or else, especially in the case of the rare metals, to the lack of data affording room for intelligent difference of opinion. Among the seventy-four atomic weights given in the table, only seven differ enough from the values computed by Clarke to excite remark. It seems fitting to give a brief statement of the reasons for the differences in those seven cases, leaving the details of reasoning about the other sixty-seven elements unpublished. The elements mentioned are antimony, cadmium, calcium, magnesium, platinum, tungsten, and uranium.

It is not my purpose to enter at length into the discussion of the antimony problem. Much of the voluminous work upon this subject is now rejected by common consent. The work of Bongartz,⁷ sometimes accepted as the best because it is the most recent, has the grave faults inherent in all methods which involve the precipitation of baric sulphate. Among all the published data Cooke's analyses of antimonious bromide⁸ ($Sb = 119.92$) seem to me the most satisfactory, because of the admirable fitness of argentic bromide for quantitative work, and because of the many precautions used in both preparation and analysis. Cooke's⁹ and Schneider's¹⁰ work upon the sulphide ($Sb = 120.5$) are perhaps the next in order; but Cooke's work upon this subject was far less satisfactory than his work on the bromide. Accordingly, the value 120.0 is given as the atomic weight of antimony in the accompanying table, instead of 120.42, computed by Clarke.

¹—Ztschr. phys. Chem. 3, 143.²—Proceedings Amer. Acad., 31, 99; 26, 294.³—Compare F. W. Kuster; Ztschr. anorg. Chem., 14, 251.⁴—Smithson. Misc. Coll., Constants of Nature, 5, (1897).⁵—Bongartz; Ber. d. chem. Ges., 16, 1942, (1883).⁶—Cooke; Proc. Am. Acad., 5, 13, (1877).⁷—Schneider; Pogg. Ann., 98, 293, (1856); Jour. Prakt. Chem. (2), 22, 131, (1880).⁸—Presented to the American Academy of Arts and Sciences, March 9, 1898; (American Chemical Journal).⁹—Compare Seubert; Ber. d. Chem. Ges., 21, 2180.

Although the atomic weight of cadmium has been the subject of many investigations, it is still far from certainly established. Many reasons combine to make me think that the highest of the published values are the most accurate. Dumas¹⁰ work upon the chloride of cadmium led to the value 112.23; but his method of investigating chlorides sometimes gave him too low results.¹¹ V. Hauer¹² and Partridge¹³ found cadmium equal to less than 112 by heating cadmic sulphate in a stream of hydric sulphide, but there is no proof that their initial substance was thoroughly dried. On the other hand, Bucher's conversion of cadmic sulphate into the oxide led to the value 112.36, which Bucher regards as the minimum.¹⁴ This method is one in which the tendency of the oxide to retain sulphuric acid is approximately neutralized by the tendency of the sulphate to retain water; this fact is demonstrated by Baubigny's¹⁵ good results on zinc, nickel, and aluminum, as well as Marignac's¹⁶ on magnesium. The results of Lensen's,¹⁷ Partridge, Morse and Jones,¹⁸ and Bucher, involving the use of cadmic oxalate, all in the neighborhood of 112, are likely to be too low because of the great difficulty of freeing this substance from water. Morse and Jones have clearly indicated this and other possible causes of error. Moreover, I doubt very much if it is possible to prepare the oxalate free from the nitrate by precipitation from solutions containing cadmic nitrate. The method of calculation magnifies either error by introducing it in opposite directions into the numerator and denominator. Bucher's extended work casts grave doubt upon cadmic oxide (used by Morse and Jones, and Lorimer and Smith)¹⁹ as a suitable substance to serve for a basis of operations. On the other hand, the work of Huntington²⁰ and Bucher with a bromide (a very satisfactory substance as to its preparation because it may be sublimed, and as to its analysis because of the insolubility of argentic bromide), and that of Bucher with cadmic chloride, point toward 112.3 or 112.4 as the probable figure. The electrolytic work of Hardin²¹ upon these compounds, performed unfortunately with small amounts of material, is nevertheless in favor of the lower value, 112.0, so that any value adopted must be uncertain. Clarke computes 111.95; for the following table, 112.3 has been chosen.

There is good reason for believing that Clarke's value for calcium (40.07) is probably too high. The only determinations worth considering are those of Erdmann and Marchand upon the composition of Iceland spar, and only one of their thirteen experiments is corrected for known causes of constant error.²² This experiment, which really constitutes the sum and substance of our pseudo-accurate knowledge of a very important quantity, makes calcium almost exactly 40.0. Obviously but little confidence may be placed in such meagre material; it is surprising enough that so common an element has remained forty years untouched on so unsatisfactory a basis. An extended investigation, now well advanced in this laboratory, has as its object the securing of less impeachable data upon the atomic weight of this frequently appearing constituent of the universe.

Marignac's²³ results from the quantitative ignition and synthesis of magnesian sulphate, processes in which the constant errors are likely to eliminate one another, have been so completely confirmed by the recent work of Richards and Parker,²⁴ that magnesium is represented by the figure 24.30 in the table. The results of the syntheses of magnesian oxide by Burton and Vorce²⁵ have been shown by Richards and Rogers²⁶ to be under the cloud of a serious possible constant error, and no other

results offer weighty evidence against the value just named.

An important deviation from the usually accepted figures is to be seen in the value assigned to platinum below. Our knowledge of the atomic weight of this element depends chiefly upon the elaborate and carefully executed work of Seubert²⁷ and Halberstadt,²⁸ and the only question is how this is to be interpreted. These chemists studied the platinum chlorides and platinum bromides of potassium and the platinum chloride of ammonium, weighing these compounds and some of the products of their decomposition. The careful study of the results shows at once that some source of error lies hidden in all the data, for the various ratios are not wholly consistent, even in any one series. Any value from 194.7 to 196.0 may be obtained from the figures,²⁹ the results of Seubert's work being the least discordant among themselves. Dittmar and McArthur³⁰ explain the discrepancy in the case of potassic platinum chloride by assuming that the complex salt contains traces of hydroxyl replacing the halogen and traces of hydrogen replacing the potassium, as well as a small amount of extra occluded potassic chloride. They adduce experimental evidence in proof of this view, but Seubert showed in his reply³¹ that their hypotheses can hardly be applied to his determinations. Most of Seubert's and Halberstadt's inconsistencies may be explained by the supposition that the complex salts, like all substances crystallized from aqueous solutions, contain certain traces of mother-liquor held in minute cells within the crystal structure, and that these traces of water are not free until the substance is disintegrated.

I have accumulated a large amount of experimental evidence, soon to be published, upon this subject. Water is one of the most dangerous, although one of the least heeded, impurities in this kind of work; and in my opinion it is responsible for the lack of agreement in this case. Hence the best data for the calculation of the atomic weight of platinum seem to be those concerning the relation of the metallic platinum to the potassic chloride or potassic bromide formed by the decomposition of the complex salts, for the water must surely have been expelled from these products of the ignition. According to Clarke³² potassic platinum chloride yields 40.101 per cent. of platinum and 30.671 per cent. of potassic chloride—the means of the closely agreeing results of Seubert and Halberstadt—while according to Halberstadt potassic platinum bromide yields 25.915 per cent. of platinum and 31.591 per cent. of potassic bromide. Disregarding the weight of the complex salt, and assuming that $KCl = 74.555$, and $KBr = 119.005$, it is easy to calculate the respective values 195.04 and 195.39 for platinum. The mean of these two values, 195.2, is given below, instead of Clarke's 194.89. The possible occlusion of potassic halide by the complex salt may render even 195.2 too low, but more investigation is evidently needed to prove this.

The same errors may enter into the work on other platinum metals; indeed Seubert³³ admits that traces of water were contained in some of his salts, but he applies no correction for this serious cause of inaccuracy. Since, however, Clarke's method of combining the discordant results seems more nearly to eliminate the error in these cases, his values for these elements are but little changed in the following table.

Feeling wholly unable to decide the present controversy between the two conflicting values (184.0 and 184.0) now proposed for tungsten, I have chosen the mean 184.4 as a compromise, which cannot be much more than 0.3 per cent. out of the way.³⁴

Uranium, the highest of all the atomic weights, is one of the least satisfactorily determined. Recent investigation upon this subject at Harvard seems to show that all the published data are complicated by constant errors, which, however, sometimes partly eliminate one another; accordingly the round number 240, instead of Clarke's 239.59, is printed in this table. The discussion is better deferred until our work has taken more definite shape.

Besides these seven elements, there are seventeen more whose atomic weights, as given in the following table,

²⁷—Seubert: *Ber. d. chem. Ges.*, 14, 865, (1881).

²⁸—Halberstadt: *Ibid.*, 17, 2362, (1884).

²⁹—Clarke: *Recalculation*, (1897), p. 334.

³⁰—*Trans. Roy. Soc. Edinburgh*, 33, Part II, 561, (1887).

³¹—*Ber. d. chem. Ges.*, 21, 2179.

³²—*Recalculation*, page 333.

³³—*Ann. Chem. (Liebig)*, 261, 262.

³⁴—Compare Hardin: *J. Am. Chem. Soc.*, 19, 657, (1897).

¹⁰—Dumas: *Ann. Chem. (Liebig)*, 113, 27, (1860).

¹¹—See *Proceedings Am. Acad.*, 30, 371. Cases in point: barium, strontium, sodium, and tin.

¹²—Von Hauer: *Jour. prakt. Chem.*, 72, 350, (1857).

¹³—Partridge: *Am. Jour. Sci.*, (3), 40, 377, (1880).

¹⁴—J. E. Bucher: *Johns Hopkins Inaug. Dissertation*, Baltimore, (1882).

¹⁵—Baubigny: *Compt. rend.*, 97, 906, 951, 1369, (1883).

¹⁶—Marignac: See under magnesium, later in *Am. Chem. Jour.*, Compare *Proceedings Am. Acad.*, 26, 260, 273, 31, 190.

¹⁷—Lensen: *Jour. prakt. Chem.*, 79, 281, (1860).

¹⁸—Morse and Jones: *Amer. Chem. Jour.*, 14, 260.

¹⁹—Lorimer and Smith: *Ztschr. anorg. Chem.*, 1, 364.

²⁰—*Proceedings Am. Acad.*, (1881), p. 28.

²¹—Hardin: *Jour. Am. Chem. Soc.*, 18, 1016, (1896).

²²—Erdmann and Marchand: *Jour. prakt. Chem.*, 50, 237, (1890).

²³—Marignac: *Arch. Sci. Phys. et Nat.*, (3), 10, 206.

²⁴—Richards and Parker: *Proceedings Am. Acad.*, 32, 53; *Ztschr. anorg. Chem.*, 13, 81, (1896).

²⁵—Burton and Vorce: *Am. Chem. Jour.*, 12, 219, (1890).

²⁶—Richards and Rogers: *Proceedings Am. Acad.*, 28, 200.

(Written for the Era.)

PHARMACY IN BELGIUM.

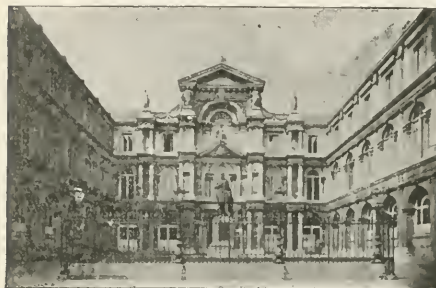
NOTES AT BRUSSELS.

Brussels, June 27th, 1898.

M. Duyk, secretary of the International Pharmacy Congress of 1897, has just terminated and issued the bulky volume recording the proceedings, and is enjoying a moment of temporary and well-earned leisure, previous to his departure for the Vienna Chemical Congress. I was lucky enough to find him in his pharmacy and asked a few questions regarding

Pharmaceutical Education in Belgium.

"Before entering the University," he explained, "we have to pass our 'humanities,' which implies a certain knowledge of Latin, chemistry, botany and zoology, as well as



The Brussels University Building.

Greek, French and modern languages and mathematics. There are five universities in Belgium; two State establishments at Ghent and Liège, a Catholic university at Louvain and our two 'free' Brussels universities—the 'Université Libre,' where the Pharmacy Congress was held, and the 'Institut des Hautes Etudes.' The course of studies necessary to obtain the 'candidature' or license of science, lasts two years, and includes philosophy, zoology and physics, botany, mineralogy, geology and chemistry. There is an examination at the end of each year. If these two are successfully passed by the student, he is then required to decide if he will graduate as Sc. D., M. D. or pharmacist. If he chooses pharmacy, he has another two years course to follow. Our professors at the Brussels University are M. J. B. Depairé (dean of the School, pharmacist to King Leopold, and one of the oldest and most respected of Brussels pharmacists) who teaches pharmaceutical chemistry and theoretical pharmacy, toxicology, etc.; M. Herlant, who deals with pharmacology and microscopy, and M. Van Engelen for practical chemistry and analysis (quantitative and qualitative). The theoretical and practical examination held at the end of the second year qualifies the successful student for his 'first diploma.' He must then pass one year in a pharmacy before presenting himself for the final examination in practical pharmacy, which gives him his 'second diploma' and with it the right to open shop in Belgium."

Druggists.

"But have you not diploma'd druggists, as distinguished from pharmacists, in Belgium?"

"The druggists formerly passed a very elementary examination, but last year this test was done away with. They are forbidden to sell poisons (except those scheduled as used for manufacturing and other industrial purposes) or compounded medicaments. The druggist's sales should be confined to such drugs and chemicals as are used in industry, but the spirit of the law is often evaded, and laudanum, tincture of iodine, etc., etc., are sold."

"Do you not prosecute?"

"Some pharmacists have done so, and in some cases conviction has been obtained. But if the druggist does a large business, he often engages a qualified pharmacist as manager, and we are powerless. This we feel keenly, and it does us much harm. But we are powerless, as the

law, although it evidently does not approve this system, is not sufficiently clear to ensure conviction."

Doctors Dispensing—A Curious Law.

"Are Belgian doctors allowed to sell medicine?"

"The law of 1818 (this old Act, passed when we were under the Dutch rule, still regulates the practice of medicine, etc., both here and in Holland) forbids the 'cumul' (or joint exercise) of the two professions, except in the flat country ('nederland') and in towns having no medical committee. Now, of course, three-quarters of Belgium is 'flat country.' But we have just gained a case at Ninove, where two doctors have been fined for dispensing."

"It looks as if the whole law required re-framing and clearer wording."

"We hope to get the new parliament—the elections are just over—to frame a new and satisfactory law. But the political state of Belgium renders the Government loth to take decisive action. The clerical conservative party, now preponderant in the Chamber of Representatives, is disposed to help us, but the Socialist element, very widespread and powerful in this country, favors 'free pharmacy.'"

Popular Co-operative Pharmacies.

"Are not you greatly handicapped by co-operative pharmacies?"

"Yes; the first was opened by a mutual aid society in Brussels about fifteen years ago. Now there are 9 here, and others in Ghent, Liège, Antwerp, etc. The Brussels pharmacies alone probably make a total of \$30,000 (150,000 francs) clear profit annually, of which part goes into the members' pockets. So long as they only supplied their members, we could not say much. But they now sell to the entire public. Here again the courts have found a loop hole in the law of 1818, which I am convinced was not intended to allow such practices."

"So you can do nothing?"

"Our Federation, which includes the Belgium Societies of Pharmacy, issued a tariff to these Provident and Mutual Societies, offering their members medicaments at lower prices than the 'popular pharmacies.' About 150 Brussels pharmacists agreed to the arrangement. The 'mutualist,' with the prescription stamped by his society, can thus purchase at 150 pharmacies instead of 9, and we trust this will induce him to go to the nearest officine on the list."

A Pharmacist in Parliament.

"Have you no pharmaceutical representative in the Chamber of Representatives?"

"Just one; the president of our Federation, M. Gilliaux. You will see his pharmacy just opposite the Gare de



Maurice Duyk, M. Delacheva, Dr. Fernand A. Derneville, Ramez.

Midi, where one takes the train for Paris. He has sat for a Brussels constituency for about four years past. No, the doctors are not numerous in Parliament, only two or three, I believe. The Socialists are what prevent our obtaining a satisfactory pharmacy law."

Too Many Pharmacists.

There are 1,800 pharmacists in Belgium, which has a population of 6,000,000; of these 300 are in Brussels, of whom about half a dozen are ladies.

Brussels Pharmacists.

On my way back to the central boulevard, I noticed in the Rue de Namur and the Montagne de la Cour many of the "Court Pharmacies" to which Prof. Remington recently alluded in his address to his pupils as one of the

characteristics of European capitals. In these, two of the aristocratic shopping streets of Brussels, the shop fronts are often handsome enough, and as often as not bear the inscription: "Pharmacist to the Court," "to the Most Serene Family of Arenberg," "to the Count of Flanders," (the King's brother) and so on. The one shown in our illustration is owned by M. Dechevalerie, who acted as interpreter when Prof. Remington read his paper at the Brussels Congress. M. Delacre's "English Pharmacy" has been demolished for street alterations; when rebuilt, it will probably be the handsomest in Brussels.

It will be noticed in the illustration that there is no "shop front," as we understand it, and no great attempt at window dressing. M. Depaire's Royal Pharmacy is in somewhat the same style. As to the smaller pharmacies in the suburbs, one might pass them almost unnoticed—a couple of carboys or china vases in the window of a private dwelling house, and a doorplate, or inscription just over the door, are considered quite sufficient. This contrasts strongly with the English chemist's red lamp and nicely dressed window, or the corner sites and commanding frontage sought for in Paris.

Foreign Patents

freely pass the Belgian custom house, and as the Brussels population is a mixed one, French, English, American, German and Belgian proprietary medicines may often be seen side by side in a window. The Belgians complain that while they admit their neighbor's goods, their own are excluded from the surrounding countries as a general rule.

"Homeopathy and Allopathy."

are inscribed side by side on every second pharmacy window. One might imagine Hahnemann's system to be as popular in Belgium as in America. "But it simply means we don't want to miss business," a candid pharmacist informed me. "Those that haven't the homeopathic remedies in stock can always get any stray prescription made up by a neighbor."

The Signs on the Druggists' Shops

are worthy of notice as relics of a fast-disappearing custom. One may see the "Three Elephants" pictorially represented over a drug store door in the Rue des Cultes, the "Chamois" and the "Eagle" sculptured over two shop-ports near the Porte de Namur and the Avenue Louise, elsewhere the Golden Sieve, the Golden Mortar, etc. But a really remarkable sign is that of the Tapir in the Rue



A Druggist's Sign.

de Namur. This is a drug store and pharmacy combined, the shop fronts and entrances separate, but a door of communication between—a novel arrangement to me. M. Fossé only put up the sign last year, and it was designed by one of his clerks, an intelligent-looking young fellow who, serving behind the drug store counter in a white blouse, is evidently an artist in his spare hours. The whole is executed in wrought iron and painted. Besides the beast itself, one may distinguish the aloe, the poppy, and the blessed thistle (*cnicius benedictus*)—types of the three old fashioned remedies, the purge, the sleeping draught and the febrifuge. Below are the serpent and cup, which symbolize medicine.

A NEW CAMPHOR DERIVATIVE.—On bringing together in proper proportions camphor, acetic anhydride and strong sulphuric acid, and maintaining a low temperature by means of ice, a crystalline body of the composition $C_{10}H_{16}OSO_3H$, or camphor sulphonic acid, is formed. A large yield of the compound is obtained only when the mixture is allowed to stand about a week, but for practical purposes it is preferable to interrupt the crystallization after 3 to 4 days, drain the crystals and wash them with ether. The new compound is intended for medicinal purposes. (Südd. Ap. Ztg.)

TECHNICAL USES OF SEA-TANG.—A recent patent has for its purpose the technical utilization of sea plants, which are available in enormous quantities. The plants of the genus *Laminaria* contain a pectin-like substance, that would be capable of extensive industrial application, if it was possible to obtain it in pure form. A Norwegian inventor has succeeded in this and has patented the following process: The tang is treated with diluted hydrochloric or sulphuric acid, which brings into solution its peculiar acid, combined in the plant with lime, together with other organic matter and inorganic salts. The residual mass is washed and can be used directly after addition of alkalies. The resulting mucilaginous product is proposed to be used as a sizing for paper, as a substitute for starch, and as a washing material. (Südd. Ap. Ztg.)



A Court Pharmacy.

PESTS AND POISONOUS CREATURES PECULIAR TO CUBA AND THE PHILIPPINES.*

BY G. A. STOCKWELL, F. Z. S.

The mosquito is omnipresent, but exhibits the extremes of virulence on the shores of the Arctic Ocean and in the tropics. Not content with removing a portion of her victim's blood—it is the female that is always the offender—she delights to replace it with a poison that leads to itching, swelling, and, perhaps, even more violent inflammation.

Closely allied to the mosquito, but much more vicious and virulent, is the gnat of the tropics, against the onslaughts of which mosquito netting is no barrier.

Even a greater pest is the minute tropical sandfly, for it is still more difficult to cope with and more venomous than either of the foregoing. Like the gnat or mosquito, this pest is most abundant near the water, but, unlike the other two, it does not haunt marshy districts and damp herbage, but rather sandy and ridgy ground.

So-called "horse flies" or "deer flies" will attack man, sometimes more viciously; and in the tropics especially they are also the torture of all four-footed kind that are not efficiently protected by natural clothing or artificial methods. All are bloodsuckers; still worse, they delight to deposit their larvæ beneath the skin along the spine of horses, mules, etc., where the integument is thinnest, and one species also deposits its eggs in the nose of these creatures. The bite of the horse fly is quite painful, and will induce swelling and inflammation that may last for days; it can even induce blood poisoning. A favorite spot of attack, as regards man, is the back of the neck; but so expert is the fly at venesection, that it is not until its body is gorged with blood that its presence is suspected.

Another plague is an exceedingly small insect belonging to the class known as mites. It is, in fact, so minute as to escape observation unless the eye is brought close to it. Its favorite lurking places are among the grass and upon minor shrubs. It has a variety of local names, notably "diablotto colorado," though in the French West Indies, because of its bright scarlet hue, it is known as "bête rouge." It abounds during the rainy season, and its bite causes intolerable itching, which, as Schomburg expressed it, "by day drives the perspiration from every pore, and at night makes one's hammock resemble the gridiron on which St. Lawrence was roasted." Nevertheless, the bites must not, on any account, be scratched, since, if the skin is once broken or abraded, a most ugly sore is apt to result which will be very difficult to heal.

Blood-sucking ticks are another annoyance of tropical regions. They bury the whole head in the flesh and extend their bodies with blood ere they are discovered, and any ordinary attempt at removal only detaches the latter, leaving the head behind to create trouble. The head should be removed with needle or knife and the wound subsequently dressed antiseptically. The most blood-thirsty form is termed "garapata."

There is likewise a species of ant (hormigas) that lives in and about the sugar-cane fields, being very destructive to the canes; but it does not hesitate to attack the man who camps on or near its preserves, when it becomes more obnoxious than the ticks or even the bête rouge. This "vivlagua," as it is called, bites with exceeding fierceness, producing the impression that one has been pierced by a red-hot needle. Luckily, it is by no means generally distributed, and seldom takes the offensive, save in the rainy season. Unfortunately, there is no protection to be had from its onslaughts or those of the ticks and diablotto colorado except carefully burning over the ground before camping or using a liberal sprinkling of insect powder, or of poke root and borax mixed. But a certain amount of immunity may be had against ants and ticks, as well as centipedes, scorpions, spiders and venomous reptiles, by wearing tight, close-woven canvas leggings or high-topped boots.

Another insect, one that closely resembles the common flea, and in Cuba and Puerto Rico demands to be specially guarded against, is the "nigua," chigoe, or "jigger." It is the female only that is annoying, and she is especially

apt to work her way beneath the skin at the ankles, or preferably at some part of the foot, most often between the toe nail and the flesh, but sometimes between the toes. Having buried herself, an intolerable itching results, at first rather agreeable than otherwise, but after a few hours becoming intolerable and merging into most violent pain; at the same time a small white, bladderlike tumor develops under the skin, about the size of a pea, with a dark spot in the center. The tumor is the rapid-growing nest, developed from the posterior portion of the body of the chigoe, and the black spot is the anterior portion of the little pest. Now it is full time to think of getting rid of the incumbrance, an operation in which negro women generally are very expert. With a fine needle they remove the skin from the little ball or nest, precisely as one would peel an orange, and then, making pressure with the thumbs, succeed in squeezing out the sac of eggs; the cavity is then filled with snuff or tobacco, to guard against the possibility of development of any ova that may accidentally have escaped from the sac and been left behind. The unacclimated and newcomers are especially subject to the attacks of the chigoe. Violent inflammation and even mortification and gangrene have resulted from neglected chigoe sores.

Scorpions are peculiar to the tropics and subtropics the world over, and equally abundant in the Philippines, Canaries, Puerto Rico and Cuba. They for the most part hide under stones, fallen tree trunks. In the roof thatch and dark corners of deserted huts and obscure parts of inhabited dwellings; likewise they have an unpleasant way of taking possession, overnight, of one's boots, stockings or trousers. Their weapon is the tail, and it is used by bringing the latter forward over the back and head; but the creature first endeavors to lay hold of the object it desires to sting with its claw or lobsterlike pinchers, presumably to obtain better leverage for his weapon, or to escape the fee. Despite the tales of travelers, scorpion stings, though painful, are not usually dangerous to persons in good health, and are generally easily relieved by camphor, rum, lemon juice, ammonia or solution of carbolic acid, though considerable inflammation and swelling may be produced, and even persist for a couple of days, along with slight fever. It is only in rare instances these symptoms present any marked degree of severity. The American forms of scorpion are much less virulent than their European, African and Asiatic brethren.

The centipede is another bugbear, and is had in the tropics of all sizes from one inch to six inches in length, and a diameter of less than a quarter of an inch to the size of one's thumb; but it is no more dangerous than the scorpion—which it resembles as regards habits—except as it is made an excuse for swallowing large quantities of alcohol. Its weapons are its jaws; and it, too, has an unpleasant way of taking possession of loose wearing gear. The remedies used for the sting of the scorpion are equally effective here.

Spiders of infinite variety of sizes, color and habits are numerous in the tropics. Though the majority are not to be classed as poisonous, their bites seem especially prone to develop the fevers of the region or to provoke ulcerations that are healed only with the greatest difficulty. The ground and trapdoor spiders grow to great size; often the body alone is two or two and a half inches in length. They are hairy, most repulsive creatures, living in wells or tubes excavated in the soil, with a trapdoor atop which is closed when the tenant is at home. The common trapdoor spider is generally known as "tarantula" in Jamaica, Puerto Rico and Cuba, because of its close resemblance (but generally of smaller size) to the true tarantula, which is also found, but more sparingly. Both will inflict unpleasant wounds when opportunity offers, but these are not of the highly poisonous and dangerous nature generally imagined. No death has ever been recorded as the direct result of a bite of either the tarantula or centipede, or of a sting of the scorpion. The writer has suffered from all three, and never witnessed any more untoward result than an ephemeral fever, and he would infinitely prefer such to the onslaughts of myriads of mosquitos, ants, gnats, or the tortures inflicted by the bête rouge.

There is but one virulent serpent in Cuba and Puerto Rico, but there are two in the Philippines. That of the former islands, known as boaquira, or Juba pronounced

* Major portion of an article published in and reprinted from Scientific American Supplement.

huba), is never more than four or five feet long, and practically, if not specifically, is identical with the rattlesnake of Florida; fortunately, it can generally be recognized by its mode of coiling when about to assume the offensive and the warning it always gives before striking. The claim that venomous serpents can always be detected by their broad, flat, lanceolate heads is by no means to be depended upon; but they usually exhibit an aperture or slit on each cheek behind the nostrils and an elongate, vertical pupil like many other nocturnal creatures—for venomous snakes are generally nocturnal or crepuscular, or both, and when they are met abroad in the daytime their presence is due to accident; again, no venomous serpent will ever be found in or on a tree, and most have clubbed instead of slender tails; and rattlesnakes prefer, as a rule, the more dry, elevated and stony districts. When other evidence is lacking as to the character of the reptile, it may be pinned to the ground by means of a short-forked stick pressed upon the neck immediately behind the head, when the mouth can be pried open and examined for poison fangs. Commonly under such circumstances the fangs will be seen hanging perpendicularly from either side of the forepart of the upper jaw, or may be directed forward in a horizontal plane, just projecting beneath the upper lip—the position for wounding or striking. Beside, if the creature is enraged, minute drops of mixed venom and saliva will be seen exuding and dripping from the fangs. If the serpent is quiescent, these fangs are retracted until they lie horizontally along the upper jaw with their points looking backward. Though rattlesnakes are dangerous, more so in warm than in more temperate regions, the wounds they inflict are not so universally fatal as popular prejudice would lead people to believe. Were this not so, there would never have been exploited the number of nostrums that on various occasions have received credit as being "perfect antidotes" and "sure cures."

It has just been remarked that rattlesnakes are by no means so venomous as generally imagined. This is dependent on two causes, viz., season and habits of life. Their extreme virulence is developed during the hot season or the period of reproduction. But venomous snakes, with few exceptions, are sluggish, and the poison they possess is given them as a means of securing prey. This poison, consequently, is a powerful paralyzant, and the creature bitten cannot get far away from his would-be devourer. Once a creature is bitten the major portion of the poison contained in the sacs at the base of the fangs is used up, and it requires hours to reproduce it in any quantity. The second use of the fangs, consequently, does not develop the virulence that the first does; and the third is still less venomous, and perhaps not at all so, the fluid exuded by the fangs being merely a secretion analogous to that developed in the salivary glands of man. Space will not permit an elaborate description of the mechanism of the poison apparatus, but this much may be said in the way of warning, viz., that even after the fangs are removed the creature sometimes develops a new pair with surprising rapidity, the only safeguard being to destroy the bulb at the root of each of these tiny weapons; also that the vipers of the far East are more abundantly supplied with venom than the rattlesnakes and are more virulent and the fangs more quickly renewed.

There is also found in Cuba and Puerto Rico a form of boa constrictor termed by naturalists the "dog-headed tree boa," and known to the natives as the "maja" (pronounced mahya), which scarcely ever exceeds seven to ten feet in length. It is harmless as regards men, save if cornered, when it certainly will fight, and because of the peculiar hooked character of its teeth inflicts fierce, ugly, deep and ragged bites that may, though the creature is in no sense venomous, provoke bad ulcers difficult to heal, or even lead to blood poisoning.

Every creature so far mentioned has its representative in the Philippine Islands, which have, in addition, a blood-thirsty land leech, most tormenting but not dangerous, and whose attacks in certain districts are not to be avoided except by the use of stout, specially woven leggings. Countless hosts of these infernal rising ground contiguous to certain low-lying dark jungles. They are about an inch in length, of the diameter of a fine knitting needle, but capable of distension until they have doubled their length and attained the diameter of a goose-quill; and

their structure is so flexible that they not only insinuate themselves through the meshes of a fine-silk stocking, seizing on the feet and ankles, but ascend to the back and throat and fasten on the most tender parts of the body; the scrotum, inside of thighs and contiguous parts, are favorite parts for attacks. The whites are obliged to protect themselves by means of "leech garters," the cloth being woven so closely as to be absolutely impermeable. The creature, when on the lookout for prey, plants one extremity on the earth, raising the other perpendicularly to look out for victims, and such is their vigilance and instinct that on the approach of man, horse or buffalo, they may be seen among the fallen leaves and grass, even on the stalks of the latter, close to the edge of the path, poised erect, waiting to attach themselves. And now their peculiar mode of progression may be noted, which is by semi-circular strides, so to speak, by advancing one extremity, arching the body and bringing the other extremity forward, till by successive advances they are liable to lay hold of the victim. If man, the clothing is ascended in search of some entrance; and if there is a party, those in the rear ranks are always the greatest sufferers, for the little creatures gather with wondrous celerity, being guided, apparently, more by the vibration produced on the ground than any phenomenal range of vision. Their size is so insignificant and the wounds so skillfully inflicted, that their presence is usually unsuspected until the victim is warned by the trickling of blood or by the cold, clammy touch of the gorged leech pressing upon the skin. In those of robust health, leech bites amount to little beyond mere annoyance, the difficulty sometimes encountered in stopping the bleeding and slight inflammation and itching like that experienced from mosquito bites; but in those of degraded habits, with the germs of tropical fever in the blood, the punctures, if rubbed or scratched, are liable to degenerate into ulcers that may lead to loss of limb or life. In 1815, during the Ranyan rebellion in Ceylon, the white soldiers and Madras sepoys suffered so severely from land leeches that great numbers perished. Horses and cattle are made wild by them, and stamp the ground with fury to shake them from their fetlocks, to which they hang in bloody tangles.

Two venomous reptiles inhabit the Philippines, besides a form of boa which can hardly be deemed dangerous—one of the first named, fortunately, somewhat rare. This latter in the Taglog tongue is termed "alinmorani," and frequently attains a length of eight to ten feet, and, unlike poisonous reptiles as a class—there are but three or four exceptions—is apt to take the offensive and attack man. One should never flee from it, since then his fate is sealed, but facing the reptile, attack it with a stick or club, and, fortunately, it is easily dispatched by a slight blow on the neck. The other is a small viper, allied to the tic palunza or Russell's viper of India, Ceylon, Sumatra, Java, the Malay Peninsula, etc., called "dajon-palay" by the natives, *hoja de arroz* by the Spaniards—literally "rice leaf." It is for the most part nocturnal in habit, and during the day lies coiled up in some nook beneath thick herbage. It is well to examine boots and clothing for its presence before donning them in the morning. This viper may be recognized by its club-shaped or obtusely pointed tail.

Ticks, fleas, gnats, mosquitos, and like small pests, including spiders, scorpions, and centipedes, abound, but do not vary materially from their West Indian relatives.

Mention may likewise be made here of an exceedingly poisonous growth, fortunately very rare in Cuba, a tree belonging to the family of Dogbanes, known as "gum-acha," and one of the sources of the negro poison known as "Obeah water." So virulent is the wood that, when used as spits for the roasting of meat, the latter is so imbued with poison as to fatally affect those who partake of it. Five pounds of the wood will in twenty-four hours poison a tank holding twenty tons of water, and, unfortunately, there is no method known to science as yet whereby the poison can be detected in fluids.

Treatment.—Undoubtedly the most effective protection against venomous insects, mosquitos, gnats, sand flies, deer flies, etc., is an ointment made by mixing equal parts of oil of tar with some fat, such as vaselin or hog's lard; but the application demands to be renewed at least once an hour. Ointments of carbolic acid, oil of pennyroyal, etc., though fairly effective in temperate regions, are too

volatile to be used with success in the tropics. The very fat base of an ointment, as well as the heat of the skin, seems to favor volatility. Carbolic acid in watery solution, if it does not come in direct contact with the skin, i. e., on hairy parts, is more successful, especially as regards deer or horse flies. Horses and mules may be protected from their attacks by sponging thoroughly every three or four hours with a solution made by adding one or two tablespoonfuls of acid to a stable bucketful of water. Lemon and lime juice tend to reduce the pain and swelling induced by the bites; also powdered ipecac made into paste with water and applied. Where flies deposit their larvæ in the nose of an animal a douche or solution of corrosive sublimate, 1:1000 or 3000 (or potassium permanganate, 1:500), is usually very effective, and should be followed by daily insufflation of calomel. The same treatment applies to man when insects of smaller variety, as they sometimes do, deposit larvæ in the nasal passages; also chloroform inhalations or spray are valuable and sometimes the only effective remedy. When larvæ are deposited in the back of a horse or mule, the sac demands to be freely opened, and packed with an antiseptic such as iodoform and boric acid, equal parts.

Despite idle tales regarding scorpion stings, the swelling and inflammation are usually allayed by camphor, rum, lemon juice, carbolic acid, ipecac poultice, or a liniment made by mixing equal parts of ordinary ammonia water, olive oil, and laudanum. Also a few drops of ammonia water or the aromatic ammonia spirit, diluted, may be given internally if demanded.

The intolerable itching caused by the *bête rouge* is best relieved by rubbing the bitten spot with strong lime or lemon juice, rum, alcohol, saturated solution of camphor in spirit, or carbolic acid of medium strength. Tincture of echinacea and oil of lobelia have been recommended on theoretical grounds, but the evidence thus far adduced must be considered as insufficient.

As a matter of fact, there is not and cannot be any such thing as an antidote to serpent venom; it is a physiological impossibility. The only thing that can be done is to throw a ligature—a tightly tied and twisted cord or handkerchief—about the bitten limb and above the wound, foster free bleeding therefrom, and as soon as possible seek the services of a medical man. As the poison exerts its chief effect upon the brain and nervous centers, as evinced by drowsiness, stupor and failure of heart and respiration, every effort should be made to combat the two former and sustain the two latter, which is best done by violent exercise, which should be enforced at the point of the stick, if all else fails. The real secret of the phenomena developed, as above, and also including the swelling and discoloration of the parts, is that the poison destroys the blood corpuscles with which it comes in contact. These corpuscles agglutinate, and some cling to the walls of the smaller blood-vessels, producing the swelling and discoloration, while others in agglutinated form are returned to the heart, carrying more or less disintegration to other corpuscles with which they come in contact, and when sent to the lungs they are unable to take up any of the oxygen there provided by the respiratory act, but are returned to the heart and sent back again through the circulation, a large proportion going to the brain and clogging its minute blood-vessels, interfering with function and provoking paralysis. Violent exercise not only sustains the heart and respiration, but opens the ducts and pores of the skin, stimulates the kidneys and lungs, and thus tends to get rid of the poisoned and effete matters in the circulation by the process of excretion, which is thus greatly hastened. Alcohol, strychnine, and other stimulants, except given by a medical man to stimulate and sustain a flagging heart and circulation (and their use demands great circumspection and their action to be carefully and steadily watched), are often more detrimental than otherwise. The powerful nature of the serpent venom and its effect upon the circulation can be surmised from the fact that those poisoned thereby develop most fetid exhalations of the body and breath; the blood loses its power of absorbing oxygen and of coagulation; the mucous membranes, particularly of nose and mouth, become spongy and bleed on the least provocation, and the hemorrhage, though seemingly of natural hue, gives scarcely any stain or color to a handkerchief or other white cloth, all evidencing the great destruction that has

been wrought among the vital constituents of the circulation.

Discussion of treatment by "antivenin," so-called, or by the serum method, would here be unprofitable, since such demands the judgment and intervention of a medical man.

PHARMACY.

DETERGENT AND DISINFECTING SOLUTION.—A new patent process of making a detergent and disinfecting solution, consists in mixing a solution of borax and ammonia and finally adding Labarraque's solution of chlorinated soda.

CURRENT LIQUEUR.—The following formula is recommended by Schrader (Südd. Ap. Ztg.): 500 parts of ripe currants are washed and macerated for 4 days with a mixture of alcohol, 600 parts, water 400 parts. Ceylon cinnamon 4 parts, cloves 2 parts and coriander 2 parts. The mixture is then strained, 375 parts of sugar dissolved in the liquid and the solution filtered.

BATH SALT.—A compound for use as a bath salt, "comprising not less than eighty parts of salt, and not more than twenty parts of borax, soda-ash, glycerin and oil combined with oil of lavender, oil of bergamot, sweet orange and alcohol" is the subject of a recent United States patent. The proportions are so arranged as to "leave a part of the alkali uncombined."

PREPARATION OF A NEW QUININE DERIVATIVE.—A solution of quinine hydrochloride in a mixture of alcohol and water is treated with ozonized gas, until no further precipitation takes place on addition of alkalis. The new preparation is an amorphous powder of yellowish color, very soluble in water, alcohol, ether and benzol, and has an acid reaction. It is an oxidation product answering to the formula $C_{16}H_{25}N_2O_8$. (Ap. Ztg.)

LYCOTONINE, an alkaloid obtained from *Aconitum Lycotonum*, is a yellowish powder, which is very sparingly soluble in water, but easily soluble in water acidulated with acetic or tartaric acid. According to Marchetti it is a feeble heart-poison. The lethal dose for frogs is about 0.8 Gm. for 1 kilo of body weight. Warm blooded animals require still more. At the same time it exerts a paralytic action on the nervous system and a peripheral action on the striped muscles. (Südd. Ap. Ztg.)

STERILIZATION OF SURGICAL INSTRUMENTS WITH CYANIDE OF MERCURY.—Maréchal has observed that steel or nickel instruments are not attacked, when the solution of corrosive sublimate is rendered alkaline by the addition of borax, soda, or sodium benzoate. Denigès has found it preferable to substitute mercury cyanide for the sublimate in such solutions, and recommends the following solution for the sterilization of instruments: Cyanide of mercury 2 to 5 parts, borax 10 parts (or soda 14 parts) and water 1,000 parts.—(Südd. Ap. Ztg.)

DISTINCTION OF GUAIACOL FROM CREOSOTE.—Prof. Vital proposes the following: If a drop of very dilute formaldehyde solution (1:1000) be mixed in a porcelain capsule with a drop of an aqueous solution of guaiacol and about 1 Cc. of concentrated sulphuric acid added to the mixture in drops from a pipette, a beautiful violet coloration is observed, which finally extends throughout the liquid. A solution of pure guaiacol, mixed with concentrated sulphuric acid alone, becomes green. Creosote, when treated in a similar manner with formaldehyde, also becomes violet, but with a distinct carmine shade; the mixture also becomes very turbid, with the separation of carmine-red flakes after some time, on the edges of the liquid. Guaiacol under the same conditions remains perfectly clear and separates no flakes. If instead of formaldehyde acetaldehyde be used, a pure carmine-red color is obtained with creosote (Ph. Post.)

INSTABILITY OF GLYCERO-PHOSPHORIC ACID.—When a solution of glycerophosphoric acid is evaporated for concentration, the acid is split up into glycerin and phosphoric acid. When glycerophosphoric acid is neutralized with a base and another acid added to the resulting salt, not glycerophosphoric acid is liberated, but the corresponding acid phosphate is formed. On decomposing glycerophosphate of lead with hydrogen sulphide, only phosphoric acid is obtained. Commercial glycerophosphoric acid is never chemically pure, but is always a mixture of acid salts, together with glycerin and phosphoric acid. (Jour. de Ph. et Chem., through Südd. Ap. Ztg.)

FORMULÆ FOR ADMINISTRATION OF SQUILL. (Comby, in La Med. Mod.—(1.) Bulb. scill. plv. 0.05 Gm. (4-5 grain); sacch. lact. 0.5 Gm. (8 grains). Divide in 5 portions. One every 2 hours.—(2.) Bulb. scill. plv., fol. digital. plv., fol. scamml. plv. aa 0.05 Gm. (4-5 grain). sacch. lact. 1 Gm. (15 grains). Divide into 5 doses. One every 2 hours.—(3.) Bulb. scill. plv., calomel vop. par. aa 0.02 Gm. (1-3 grain), sacch. plv. 0.2 Gm. (3 grains). Divide into 5 powders. Dose for a child 10 years old, 5 powders daily.—(4.) Bulb. scill. plv. 0.02 Gm. (1-3 grain), sulph. lot. 0.04 Gm. (2-3 grain), sacch. plv. 0.1 Gm. (1½ grain). Daily 3 to 5 such doses for bronchial-pulmonary affections of children.—(5.) Bulb. scill. plv. 0.05 Gm. (4-5 grain), pil. extr. scill. spir. 0.1 Gm. (1½ grain), f. cum glycerin. q. s. pil. 1. Daily 2 to 3 pills at 10 to 15 years of age.—(6.) Tinct. scill. (1:5), tinct. digital. aa gtt. 10, syr. quinquie radic. 15.0 Gm. (½ f. oz.), aq. dest. 60 Gm. (2 f. oz.). Dose, a teaspoonful at 5 years.—(7.) Oxydel. scill. 10.0 Gm. (150 grains), tinct. belladonnae, tinct. aconite rad. aa gtt. 10, syr. terebinth. 10.0 Gm. (150 grains), aq. dest. 40.0 Gm. (1 1-3 f. oz.). Dose, a teaspoonful every 2 hours.—(8.) Vin. scill. 10 Gm. (150 grains), syr. cerast. 10 Gm., decocti rad. tritici 60 Gm. (2 f. oz.). To be taken in 3 or 4 doses. For children 5 years old. (Ap. Ztg.)

PHYSIOLOGICAL ACTION OF COFFEE AND TEA.—After numerous experiments, Prof. Lehmann and Dr. Wilhelm have come to the conclusion that the volatile products (coffeen) of roasted coffee, to which the aromatic odor and taste are due, have no physiological effect on the heart, brain, muscles or kidneys, even in very large doses. The toxic effects of coffee, when taken in large quantities, cannot be ascribed to them, but only to the caffeine it contains. The volatile products in coffee substitutes are also without any action. Lehmann and Tendlau have shown that the volatile constituents of tea (tea oil) are entirely without action. The infusion of 6 to 10 Gm. of tea, taken at one dose, did not produce a very decided effect. Increase of this dose to 3 or 4 times the quantity, produced a series of typical symptoms: Muscular tension, spasms, fatigue, tremors, vertigo, feeling of heat, etc. The action of the tea was not distinctly influenced either in number, power or regularity of the beats. Of all these and other disturbances not the slightest indication was observed when the distillate from tea or from an ethereal extract of tea was taken by a number of different persons, even from 150 to 200 Gm. of tea. It is evident that the tea oil does not participate in the toxic action of tea, but acts only as a corrective of taste. The stimulant action of tea is therefore to be sought in the alkaloid. (Arch. f. Hygiene, through Ap. Ztg.)

TURTLE-LIVER OIL.—Oliviero relates the following in Bull. Commercial concerning the turtle and an oil obtained from its liver: Chelonia midas is one of the largest varieties of sea-turtles, found in the vicinity of the Seychelles, a British island group in the Indian Ocean. The animal reaches a weight of over 1,000 pounds, and the liver 30 to 40 pounds, containing about half its weight of an oil, that is obtained in similar manner as codliver oil by expression in the cold. The oil is straw-yellow and thick. At 15° C. a considerable quantity of solid fat is separated from it. The odor is characteristic, but also suggestive of codliver oil. Its reaction is feebly acid. The specific gravity is 0.905 at 15° C., while that of codliver oil is 0.930, and most vegetable oils range between 0.915 and 0.935. The oil is but sparingly soluble in alcohol, easily soluble in ether benzoin. Cooled for only a few moments at +6° C., it assumes the consistence of butter. It is a non-drying oil, and does not readily become rancid.

From codliver oil it is distinguished by the following reactions:

	Turtle-liver oil.	Codliver oil.
Sulphuric acid	Brown	Violet
Nitric acid	Brownish	Red
Cailliet's reagent (HNO ₃ , H ₂ SO ₄ , H ₃ PO ₄)	No action	Red

The natives of the Seychelles use the oil for the same purposes as codliver oil. (Ap. Ztg.)

NEW ALKALOIDAL REACTIONS.—Brunner and Strzyzowski have published the following reactions, discovered by them, in Schweiz. Wochschr. Chloral hydrate: A crystal of the reagent is warmed with 15 drops of sulphuric acid and a little of the substance to be tested. Morphine gives a green color, after addition of soda solution red. Colors given by other alkaloids are codeine and apomorphine green; narcotine yellowish-green, later red to violet; narcine red, then brown; papaverine violet, becoming red when warmed; thebaine red; quinine not characteristic; strychnine and atropine yellow; solanine red-brown, colchicine not characteristic; veratrine and picrotoxin red.—Bromal hydrate, used in the same manner as chloral hydrate. With morphine the reaction is the same as with chloral. Codeine gives a yellow color, then blue; apomorphine green-blue; narcine, thebaine, quinine, strychnine, atropine, colchicine, papaverine the same as with chloral; solanine red-brown or violet; veratrine red; picrotoxin yellowish-red. Paraldehyde: One drop of reagent and 5 drops of sulphuric acid are added to the substance. Morphine becomes orange; codeine orange; apomorphine violet or red; papaverine yellowish-red; then red; solanine orange, veratrine red-brown, picrotoxin yellow, reddish when warmed. Furfural: The substance is mixed with 4 to 5 drops of a fresh solution of 2 drops of furfural in 10 Cc. of sulphuric acid. Morphine becomes red, on warming olive-green; codeine red; apomorphine on warming red, then greenish; papaverine violet, warmed; solanine yellow; veratrine yellow, then green; picrotoxin yellow, then red-brown. Ortho-nitro-phenol-propionic acid: Morphine and codeine, when heated with the reagent, become violet; apomorphine violet, in the cold; papaverine violet, reddish when heated; solanine yellow; veratrine as with sulphuric acid; picrotoxin reddish, then olive-green. (Ap. Ztg.)

DISTURBING NATURE'S BALANCE.—The great and growing cost of the attempts in Massachusetts to exterminate the gypsy moth shows how serious may be the consequences to "the balance of nature" by the introduction of foreign insects or animals. A few of these moths were imported some years ago by an entomologist residing near Boston, says the New York Times. (Sci. Am.) Several of the captives escaped from custody, and the State has spent \$450,000 in the last four years in a vain attempt to exterminate their descendants. It is now estimated that at least \$1,575,000 will be required, and that the appropriation for five years to come should be \$200,000 per annum. On the other hand, a perpetual appropriation of \$100,000 per annum would serve to confine the moths to the district in which they are now found. The problem resembles that which has taxed the resources of the Australian colonies since the progeny of half a dozen rabbits, imported from England, became so numerous that the maintenance of agricultural industries was menaced by their depredations. Australia has expended millions in rabbit-proof fences and in devices for killing off the rabbits. But, although bacteriologists have endeavored to remove them by disseminating the germs of fatal disease, the colonists have thus far been able to do no more than hold the animals in check. In Florida several rivers have recently become choked by the rapid growth of a kind of hyacinth imported a few years ago, and considerable expenditures will be required to keep the streams open for navigation. An imported insect called the black scale menaced the fruit industry in California until the State procured from Australia and introduced in the orchards a little beetle which ate the obnoxious insects, and thus brought relief. These and other instances which might be cited show that the utmost caution should be observed with respect to the introduction into any country of insects or plants for which nature has made no preparation there, and the growth of which may not be restricted by natural enemies and checks with which they must contend in the countries from which they are brought.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Formula Wanted.

(Subscriber). Buxton's balsam.

Lactated Pepsin.

(G. D. K.) A formula for a preparation containing pepsin, pancreatin, diastase, lactic acid, etc., may be found in the National Formulary, page 123. A formula for an elixir containing these substances is given in the same work, page 22. Formulas for elixirs of these substances with other combinations are given elsewhere in this department.

Liquid Pancreatin.

(Subscriber) A very satisfactory formula for a solution of pancreatin may be found in the National Formulary, page 85. It contains 25 per cent. by volume of glycerin. An English preparation is said to be made by macerating with occasional agitation pancreas, freed from fat, and cut small, in four times its weight of a mixture of rectified spirit 1 part and water 3 parts, and filtering at the end of a week.

Decolorizing Alcohol.

(H. McP.) We can suggest no better method for decolorizing alcohol colored by a copying pencil accidentally dropping into it than that of repeated filtration through charcoal. The loss by evaporation may be nearly overcome by conducting the filtering operation in a closed apparatus. It might also be worth your while to try distilling a portion of the alcohol, and if the operation proves satisfactory and less expensive than that of filtration you can then repeat it with the remainder.

Masking the Odor of Castor Oil.

(G. W. M.) Castor oil has but little odor but its peculiar nauseous taste is said to be readily removed by thoroughly washing the oil with hot water and incorporating sufficient (1 to ½ per cent.) of saccharin to impart a sweet taste. The oil may be then flavored by adding small quantities of oil of cinnamon and extract of vanilla or other suitable flavoring substances. There is no single book on the subject of "masking the odors of medicinal substances" and information on the subject must be gathered from works on practical pharmacy and pharmaceutical literature. You will do well to read the note on flavoring under "emulsions" in the National Formulary.

Homœopathic Prescription.

(C. W. H.) asks the meaning of "3x" in the following:
Magnesia phosphorica 3x
Ferrum phosphoricum 3x, aa 5 v
Plat. Char. No. LXV
Sig. One four times a day.

The prescription was evidently written by a homœopathic physician, the "3x" indicating that the third decimal attenuation of each substance is to be dispensed. Both of these salts are official in the Pharmacopœia of the American Institute of Homœopathy under the titles here used. The ferrum (ferrie) phosphate should not be confounded with the ferri phosphas (soluble ferrie phosphate) of the U. S. P. 1890. The homœopathic salt, "Ferrum phosphate" is the insoluble slate-colored ferrie phosphate of the U. S. Pharmacopœia of 1900. The resulting powders should be nearly white. The various attenuations of powdered substances are made by triturating the

drug substance with the required amount of powdered sugar of milk in the manner prescribed by the Pharmacopœia of the American Institute of Homœopathy or other pharmacopœia recognized by homœopathic practitioners.

Callouses on the Soles of the Feet.

(C. F. F.) Chiropodists generally recommend the application of a smooth piece of pumice stone for reducing the thickness of the calloused portions of the sole of the foot. The cuticle on these parts has a tendency to become callous through thickening, as the result of friction and pressure from exercise. Frequent bathing and the wearing of properly fitting shoes are usually all that is necessary to keep the feet in a satisfactory condition. An antiseptic dusting powder for the feet is the following, taken from the Era Formulaŕy:

Salicylic acid.....	2.5 grams
Alum	3.0 grams
Starch	20.0 grams
Oil bergamot.....	10 drops
Alcohol	5.0 grams
Mix and add:	
Talcum	70.0 grams

Non-Precipitating Compound Syrup of Hypophosphites.

(M. M. & S.) Griffiths' Non-Secret Formulas is authority for the following formula:

Calcium hypophosphite	256 grains
Sodium hypophosphite	128 grains
Potassium hypophosphite	128 grains
Manganese hypophosphite	16 grains
Tincture citro-chloride of iron, N. F. 1 ounce	
Tincture nux vomica.....	160 minims
Quinine hydrochlorate	8 grains
Sugar	12 ounces
Water, enough to make.....	16 ounces

The hypophosphites are dissolved in 6 ounces of water previously boiled, which is easily done by triturating the salts in successive portions of the water, the addition of an acid not being required. These solutions are mixed and poured over the sugar. Shake well and add the tinctures of iron and nux vomica, then add enough water to make 16 fluid ounces. Shake until the sugar is dissolved, let stand for 24 hours and filter. The substitution of the chloride for the hypophosphite of iron cannot well be urged against this preparation, since the amount of the original formula is comparatively insignificant and one of the causes of precipitation.

Loss of Appetite.

(H. M.) Loss of appetite is of quite frequent occurrence and generally associated with or accompanying some other derangement of the physical organism. Thus, dyspepsia, deranged liver or kidneys, malaria, most acute diseases, constipation, and a great number of conditions of the body are attended with perverted appetite. In other words, the loss of appetite is only a symptom. The existing conditions which cause it should, therefore, be removed and the appetite, in most instances, will then establish itself.

Various remedies have been prescribed for loss of appetite, but the selection of any one of them should be left to the physician. Often a change of air or of surroundings is all that is necessary. In mild cases arising from dyspepsia and torpid liver, the following have been recommended:

- (1) Dilute muriatic acid..... 1 dram
Tincture nux vomica..... 30 drops
Compound infusion of gentian..... 4 ounces
A teaspoonful in water after meals.
- (2) Quinine sulphate..... 16 grains
Tincture of nux vomica..... 30 drops
Dilute muriatic acid..... 1 dram
Syrup of ginger..... 4 ounces
One or two teaspoonfuls in water, after each meal.

This formula is said by Conwell to be excellent for general debility, loss of appetite, and malaria.

Registration in New York State.

(F. I. F.) Any person who has had four years' experience in the practice of pharmacy and passes a satisfactory examination before the Board of Pharmacy is entitled to a license as a registered pharmacist in New York State. Applicants for registration as assistant pharmacists must have had two years' experience and pass a satisfactory examination. The fee for examina-

tion and registration of pharmacists is \$10, assistant pharmacists \$3. A licensee by examination of any board within the State is entitled to registration without examination by the State Board, upon complying with the formal requirements of the particular law of the latter board. In order to obtain a license from the State Board the applicant must show by affidavit or otherwise that he is a resident of the city or county within the jurisdiction of the State Board, that he intends to practice pharmacy within such district, and that he has not applied for or been refused a license by any board within the State within the six months immediately preceding. The New York State Board of Pharmacy has jurisdiction over all territory within this State, outside of Erie County and the territory within the boundaries of Greater New York. The secretary of the State Board is E. S. Dawson, Jr., 125 South Salina street, Syracuse, N. Y. The next examination of the State Board of Pharmacy will be held Sept. 2 at Albany, Plattsburg, Rochester, Syracuse and Yonkers.

Syrupus Quinina Phosphohydrochloratis Compositus.

(A. R. G.) We think the difficulty you have met in the preparation of the syrup from the formula under the above title in this journal, April 7, 1898, page 507, is due to the fact that you have used a weaker solution of phosphoric acid than that called for in the formula. However, we give you another formula for the same preparation, published some time ago by a contemporary:

Potassium phosphate.....	236 grains
Magnesium phosphate.....	128 grains
Calcium phosphate, precipitated.....	128 grains
Iron phosphate.....	128 grains
Quinine hydrochlorate.....	32 grains
Strychnine.....	2 grains
Phosphoric acid, 50 per cent.....	512 grains
Sugar.....	11 av. ounces
Water, enough to make.....	16 fl. ounces

Flavor to suit.

Mix the phosphoric acid (reserving a small portion) with 7 fluid ounces of water, and dissolve in this, successively, the iron phosphate, calcium phosphate, magnesium phosphate and potassium phosphate, and filter the solution. Triturate the strychnine with the reserved phosphoric acid and $\frac{1}{2}$ fluid ounce of water, and incorporate with the foregoing. Then triturate the quinine hydrochlorate with $\frac{1}{2}$ fluid ounce of water and also incorporate. In the combined solution dissolve the sugar with the aid of a gentle heat, strain, and when cold add enough syrup to make 16 fluid ounces.

A preparation containing compound solution of phosphoric acid, N. F., and quinine hydrochlorate may be readily prepared by the following formula:

Compound solution of phosphoric acid.....	8 fl. ounces
Sugar.....	10 av. ounces
Quinine hydrochlorate.....	8 grains
Strychnine sulphate.....	1 grain
Spirit of bitter almonds.....	5 drops
Caramel.....	sufficient to color.

Dissolve the sugar in the acid solution, add the alkaloid salts previously dissolved in a small amount of distilled water, then the spirit of caramel, and filter.

Tooth Powder.

C. E. P.) MacEwan is authority for the following:

(1) Pearless Dentifrice.	
Precipitated chalk.....	2 ounces
Carbonate of magnesia.....	$\frac{1}{2}$ ounce
Borax.....	$\frac{1}{2}$ dram
Bicarbonate of soda.....	2 drams
Orris root.....	1 ounce
Thymol.....	2 grains
Camphor.....	5 grains
Oil of peppermint.....	2 minims
Oil of cloves.....	2 minims
Oil of lemon.....	2 minims
Oil of eucalyptus.....	2 minims
Cresote.....	1 minim

Dissolve the thymol and camphor in spirit and add to the previously well-mixed powders; then add the rest of the ingredients and sift three times.

(2) Court Dentifrice.	
Precipitated chalk.....	60 ounces
Carmin.....	2 drams
Oil of rose.....	50 minims
Oil of pimento.....	50 minims
Oil of cinnamon.....	20 minims
Oil of lemon.....	20 minims
Grain musk.....	10 grains

Triturate the musk with the carmine and $\frac{1}{2}$ ounce of chalk for five minutes, then add the oils one by one with about 1 ounce of chalk along with each oil. Continue trituration for at least ten minutes with half the chalk, add the rest, and sift three times.

An exceedingly nice tooth-powder, elegant in appearance, and of rich yet delicate odor.

(3) Columbian Dentifrice.

Precipitated chalk.....	8 ounces
Powdered soap.....	1 ounce
Powdered cuttlefish bone.....	4 drams
Powdered orris.....	4 drams
Oil of wintergreen.....	$\frac{1}{2}$ dram
Solution of carmine.....	1 dram

Mix the coloring with the precipitated chalk by trituration, sift three times, and set in a warm place to dry. Mix the soap, cuttlefish-bone and orris, to this add the oil of wintergreen, and lastly the colored chalk. Sift four times.

(4) Smokers' Tooth Powder.

Menthol.....	3 grains
Thymol.....	10 grains
Camphor.....	12 grains
Sulcyllic acid.....	$\frac{1}{2}$ dram
Powdered cuttlefish bone.....	2 drams
Powdered white soap.....	2 drams
Precipitated chalk.....	2 ounces
Oil of rose.....	4 drops

Mix the first three ingredients together in a mortar, add the chalk and the other ingredients, triturating ten minutes before sifting.

Photographic Developing and Toning Solutions.

(A. W. B.) See this journal, February 3, 1898, page 176. Here are some other formulas compiled from the Photographic Bulletin and elsewhere:

(1) Developers.

Sodium sulphite.....	50 grains
Potassium carbonate.....	40 grains
Hydroquinone.....	4 grains
Metol.....	4 grains
Water, enough to make.....	1000 Cc.

(2) One-solution Hydro Developer.

Hydroquinone.....	$\frac{1}{2}$ av. ounce
Sodium sulphite, crystals.....	$\frac{3}{4}$ av. ounces
Potassium carbonate.....	$\frac{1}{4}$ av. ounces
Sodium bromide.....	5 grains
Water.....	64 fl. ounces

Mix the sodium sulphite and potassium carbonate and dissolve in the water, then let stand for twenty-four hours; pour off the clear solution and filter the balance, making up to 64 fluid ounces with water passed through the filter; in this dissolve the hydro-quinone and the bromide.

(3) Colorless Developer.

For some purposes it may be of importance to have a developer which will keep absolutely colorless. This is particularly of advantage with chloro bromide of silver plates, which accept color very easily from the developer. The following formula is therefore recommended in the Photographic Bulletin:

(a) Hydroquinone.....	5 grams
Metabisulphite of potassium.....	5 grams
Bromide of potassium.....	0.3 grams
Water.....	600 Cc.
(b) Caustic soda.....	13 grams
Water.....	600 Cc.

Mix 60 cubic centimeters (a) with 30 cubic centimeters (b). This developer will remain colorless for days.

(4) Platinum Toning Solution.

A writer in the Spatula gives the following information regarding platinum toning: "My own experience has not been such as to lead me to recommend any other than the double toning system. To do this I prefer to use the papers especially prepared for this work. Print deep so that the shadows are bronzed and the highlights are slightly tinted; then wash through five or six changes of water to which a small amount of salt has been added. Rinse in clear water and place in platinum bath until the proper tone is reached, and then remove and fix for fifteen minutes in bath of: Hypo, 2 ounces; water, 20 ounces.

Gold Bath.—The gold bath is made by dissolving one grain of chloride of gold in 40 ounces of water and making it alkaline by the addition of saturated solution of borax. In this toning solution the prints turn to a medium purple.

The platinum bath is made by adding 1 dram of the solution given below to 20 ounces of water.

Platinum Solution.—Potassium chloroplatinite. 15 grains; phosphoric acid, 50 per cent., $\frac{1}{2}$ drams. Water to make 2 ounces.

(5) Combined Toning Bath.	
Sodium hyposulphite	4 ounces
Lead acetate	1 dram
Water	20 ounces
Gold chloride	2 grains

To be mixed in the above order and allowed to stand for twenty-four hours before being used. For colloidal-chloride, alum in any form is unnecessary; but for some gelatine papers, especially in hot weather, an ounce may be added, with an additional half-ounce of hypo to make up for that decomposed by the alum. Prints toned and fixed in this way may be relied on as being as permanent as if done in separate solutions.

Show Globe Colors.

(Water Bottle.) We have repeatedly published formulas for all manner of show globe colors in the Era. However, we give you the following, taken from the Era Formulae:

	Red.	
(1) Distilled water.....	.970 parts	
Sulphuric acid.....	20 parts	
Cochineal	6 parts	
Bitartrate potassium.....	4 parts	
(2) Distilled water.....	.970 parts	
Sulphuric acid.....	10 parts	
Cochineal	8 parts	
Alum	8 parts	
Pure cream tartar.....	4 parts	
(3) Distilled water.....	.880 parts	
Ammonia water.....	76 parts	
Nitric acid.....	32 parts	
Cobalt metal.....	8 parts	
Alum	4 parts	
(4) Carmine	3 to 5 grains	
Chloride of tin.....	3 to 5 grains	
Water of ammonia.....	1 dram	
Water, enough to make 8 pints.		

Dissolve the carmine in the water of ammonia; add the chloride of tin and water.

	Blue.	
(1) Distilled water.....	.920 parts	
Blue vitriol.....	30 parts	
Alum	30 parts	
Sulphuric acid.....	20 parts	
(2) Distilled water.....	.950 parts	
Ammonia water.....	40 parts	
Sulphate copper.....	10 parts	
Any desired shade can be obtained by varying the proportion of ammonia and copper salt.		
(3) Sulphate copper.....	160 grains	
Solution potash.....	1 pint	
Glycerine	1 pint	
Water	16 pints	

Dissolve sulphate of copper in sufficient water, add to the solution potash, then glycerin, until complete solution results. Finally add the remainder of the water.

Multicolors.

Here is a formula for the production of a so-called multi-colored mixture for show globes. Seven different fluids are named, and you can select any three of them you wish if that number is all you desire. The liquids and colors selected should be taken in the order in which they appear in the formula.

First, ascertain the capacity of the bottle and divide by seven, to find the volume of each solution or liquid to be employed. The fluids should, in the order named, be carefully poured down the side of the bottle, held in a slightly inclined position, or through a glass tube inserted into it.

First—One volume of sulphuric acid, C. P., tinted blue with indigo sulphate. Second—One volume of C. P. chloroform. Third—One volume of glycerine, slightly tinted with caramel. Fourth—One volume of castor oil, colored with alkaneet root or alkanin. Fifth—One volume 40 per cent. alcohol, slightly tinted with green anilin. Sixth—One volume of cod liver oil, containing 1 per cent. oil turpentine. Seventh—One volume of 94 per cent. alcohol, slightly tinted with violet anilin.

The liquids are held in place by force of gravity, and alternate with fluids which are not miscible, so that the strata or layers are clearly defined and do not mingle by diffusion, as in the case when miscible liquids as glycerine

and water are brought in direct contact with each other. Perhaps it is necessary to add that the colors suggested should be employed in quantities only sufficient to impart a pronounced tint to the fluids; too deep colors look dead and detract from the brilliancy of the combination.

See also article "Colored Films for Show Globes," this journal, Feb. 6, 1896, page 172.

Compound Lactated Pepsin Elixirs.

(E. L. S.)

Elixir of Lactated Pepsin and Bismuth.

Compound powder of pepsin, N. F.	640 grains
Citrate of bismuth and ammonia.....	128 grains
Water	2 fl. ounces
Water of ammonia.....	q. s.
Tincture of cudbear, N. F.....	1½ drams
Aromatic elixir, N. F., q. s. to make 1 pint	

Treat the compound powder of pepsin with $\frac{1}{4}$ fluid ounces of water for several hours; dissolve the bismuth salt in one-half fluid ounce of water, with the aid of just enough ammonia to dissolve it and leave the solution neutral; mix the two solutions carefully, add the tincture of cudbear, and lastly sufficient elixir to make 1 pint; let stand for some time and filter through pumice, passing enough elixir through the filter to make 1 pint.

Elixir of Lactated Pepsin, Bismuth and Strychnia.

Compound powder of pepsin, N. F.	640 grains
Citrate of bismuth and ammonia.....	128 grains
Sulphate of strychnia.....	1½ grains
Water	2 fl. ounces
Water of ammonia.....	q. s.
Tincture of cudbear.....	1½ drams
Aromatic elixir, N. F., q. s. to make 1 pint	

Treat the compound powder of pepsin with $\frac{1}{4}$ fluid ounces of water for several hours; dissolve the bismuth salt in one-half fluid ounce of water, with the aid of just enough water of ammonia to dissolve it and leave the solution neutral; dissolve the strychnine in about two fluid drams of the elixir, with the aid of heat; mix the three solutions and the tincture of cudbear and sufficient elixir to make 1 pint; allow to macerate for some time and filter through pumice, passing enough elixir through the filter to make 1 pint.

Elixir of Lactated Pepsin and Callosaya.

Compound powder of pepsin, N. F.	640 grains
Elixir of callosaya, N. F., q. s. to make 1 pint	

Digest together for several hours or days and then filter through pumice, passing enough of the elixir of callosaya through the filter to make 1 pint.

Elixir of Lactated Pepsin, Bismuth, Iron and Strychnia.

Compound powder of pepsin, N. F.	640 grains
Citrate of bismuth and ammonia.....	128 grains
Pyrophosphate of iron.....	128 grains
Sulphate of strychnia.....	1½ grains
Water	2 fl. ounces
Water of ammonia.....	q. s.
Tincture of cudbear, N. F.....	1½ drams
Aromatic elixir, N. F., q. s. to make 1 pint	

Treat the compound powder of pepsin with one fluid ounce of water for several hours; dissolve the bismuth salt in one-half fluid ounce of water, with the aid of just enough ammonia to dissolve it and leave the solution neutral; dissolve the strychnine in about two fluid drams of the elixir, with the aid of heat; dissolve the iron salt in one-half fluid ounce of water, with the aid of heat; mix the four solutions, add the tincture of cudbear and sufficient elixir to make 1 pint; allow to macerate several days and filter through pumice, passing sufficient elixir through the filter to make 1 pint.

Elixir of Lactated Pepsin, Bismuth, Iron and Gentian.

Compound powder of pepsin, N. F.	640 grains
Citrate of bismuth and ammonia.....	128 grains
Pyrophosphate of iron.....	128 grains
Water	1 fl. ounce
Water of ammonia.....	q. s.
Elixir of gentian, N. F., q. s. to make 1 pint	

Dissolve the bismuth salt in one-half fluid ounce of water, with the aid of just enough ammonia to dissolve it and leave the solution neutral; dissolve the iron in one-half fluid ounce of water, with the aid of heat; mix the solutions thoroughly; dilute to 1 pint with the elixir of gentian, then stir in thoroughly the compound powder of pepsin; allow to stand several days and filter through pumice, passing enough of the elixir of gentian through the filter to make 1 pint.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XX.

NEW YORK, AUGUST 11, 1898.

No. 6.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483,
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL	169
PRIZE WINNERS, ERA	
COURSE	171
Testimonials, Era Course, 172	
CORRESPONDENCE	173
ORIGINAL AND SE-	
LECTED PAPERS.	
Difference in Cocaine	
Muriate from Different	
Manufacturers	174
Mineral Resources of Cuba 175	
How Spices are Adulter-	
ated	178
Pharmacy in Australasia. 179	
Importance of Method in	
Teaching Materia Medica 179	
PHARMACY	181
QUESTION BOX	182
NEWS AND TRADE DE-	
PARTMENT	185
Opposition to Manufactur-	
ers' Advance in Prices;	
St. Louis Druggists Con-	
demn Manufacturers ... 185	
Scott & Bowne Ask Dam-	
ages of Blackburn: Drug	
Clerk's Bravery Costs	
His Life; Mr. Olmsted	
Not to Blame	186
Certainly	187
NEWS LETTERS	187
Associations	193
BUSINESS RECORD	194
Pharmaceutical Affairs in	
Great Britain	195
DRUGGISTS' ADVERTIS-	
ING	196
OBITUARY	199
BOOK REVIEWS	199
Classification of Scents in	
Vegetable and Animal	
Kingdoms	200
STATE OF TRADE	201
MARKET REPORTS	202

CHANGES IN PHARMACY.

The older pharmacists do not need to be educated over again, but they all know that methods, and even facts, in pharmaceutical practice differ to some extent from those of years ago. They are also aware that a review of studies and renewed acquaintance with elementary principles are great helps in keeping their knowledge up to date. The Era Course in Pharmacy offers a most desirable opportunity to pursue a systematic review of pharmacy. The method of conducting the course keeps up attention and interest. The time necessary to be devoted to it can easily be spared by even the busiest pharmacist, and the expense is but nominal. The expenditure of \$8 secures the Era, which every pharmacist should have anyway, and also provides for the quizzes and examinations by mail which are features of the Course.

Practicing pharmacists who wish to review their early studies under the guidance of competent instructors, and thus better equip themselves professionally, should send for prospectus, giving full details of the Era Course in Pharmacy. Both Junior and Senior classes begin work during the first week in September and lectures for both classes begin in the first issue of the Era in that month.

Address,

The Pharmaceutical Era,
Box 1483, New York.

THAT PHARMACEUTICAL TRUST!

With the approach of the harvest season comes the annual renewal of talk about that combination of manufacturing pharmacists. The arguments used in favor of such a movement remind one of that philanthropic bachelor who proposed to organize a "universal nursery" for the economical raising of babies. He had unquestioned figures in support of the economies of his scheme. He showed how much could be saved on doctors' bills, on medicines, on nurses' wages, on baby carriages and baby foods, and all the numerous et ceteras of a well-regulated nursery, besides the wear and tear on mothers' nerves and the sleepless nights saved to the dear papas. But when he tried to put the scheme into operation he soon found out how little a bachelor knows about the baby business.

A combination of pharmaceutical manufacturers would be an admission that all pharmaceuticals, like all babies, are alike. It would kill the claims which each manufacturer has been making for his goods, and would place these goods on the same basis of competition as barbed wire, nails, steel rails, sheet brass and other goods which are sold purely on their physical merits. When this is done the pharmaceutical business is doomed, for these goods cannot be produced and sold on the ordinary profit of staple commodities.

The pharmaceutical business to-day is cursed with too much commercialism—too much talk about price and not enough about quality. Selling compound cathartic pills by the pound, quinine pills by the ounce and fluid extracts by the gallon has a tendency to attract the buyer's attention too much to the price of the goods which he is purchasing and takes his thought away from the matter of quality, which is the charm that makes the manufacturing pharmacist his profits. The physician who announces that his charges per visit are the lowest is not often the one who has the largest practice. This same principle applies in a very large degree to medicines. The manufacturer must give the physicians and pharmacists to understand that his goods possess a certain merit which cannot be found in other brands. Call it humbug, if you will, but secrecy it must be, and if supported by honest, scientific research and merit, all the better. Our great lines of pharmaceutical products have been built up on these claims for quality and merit, not cheap prices.

Get together, gentlemen, and have a better understanding among yourselves to prevent ruinous and senseless competition. Let each man show some respect for the prerogatives of his competitors, and do not try to steal the other man's thunder and make every line of goods which every other fellow makes. But don't make the serious mistake of a financial combination and thereby kill the charm of your profits by giving physicians and pharmacists to understand that Warner's pills, that P. D. & Co.'s pills, that Wyeth's pills, that Schieffelin's pills, that S. & D.'s pills, that McK. & R.'s pills, that Upjohn's pills and all the other standard brands of pills, can be turned out with the same crank.

Sale of Medicine by the Unqualified.

A case which strongly emphasizes the danger of allowing the sale of drugs, even the usual "household remedies," by general storekeepers, grocers, etc., has come to notice in Atlanta, Ga. A grocer in that city sold to a customer a bottle labeled and supposed to contain quinine, but which, it is alleged, proved to contain morphine. The customer nearly lost his life through taking a dose of the drug, sued the grocer and recovered damages, and now the grocer sues the person from whom he bought the stuff, and who is held to be liable for the alleged error in labeling. The grocer frankly admits that he knows nothing about drugs, is not familiar with quinine and morphine and cannot tell the difference between them, and that, as the drug sold him was labeled quinine, he had no reason to believe it was not. Georgia is not the only State in which happenings of this sort may occur. Its Board of Pharmacy is as good as any and better than many in the matter of enforcing the pharmacy law, but the trouble is with the law itself. The ordinary pharmacy law is usually a compromise measure. However good in its original proposed form, to secure the enactment of any State pharmacy law it is usually necessary to make concessions all along the line, and there is a lot of politics in question, too, so when the law is finally passed, its framers have great difficulty in recognizing it as their child. Most pharmacy laws are punched full of holes, through which doctors and storekeepers and "family remedies" venders and patent medicines may escape. Some time, perhaps, the public will get a little more sense and recognize that health and life of the people are not sufficiently safeguarded by the customary pharmacy law, but that something better, more stringent, is needed. The grocer is expected to recognize from their physical appearance the sugar, the herrings, the corn and potatoes he sells. We are justified in demanding that the seller of quinine and morphine and all drugs and medicines be equally familiar with these articles.

An Unique But Abortive Scheme.

"Endless chains" are the fad, but they are fast becoming an intolerable nuisance. We have endless chains to furnish ice to Uncle Sam's sailors and soldiers, and even the Secretary of the Navy has not escaped being made the victim (the receiving agent) of such a scheme. It is, however, carrying the thing a little too far when a patent medicine manufacturer attempts to adopt this method to supply Uncle Sam's fighters with a particular medicine, and at the same time, incidentally, of course, to enrich himself. This patent medicine man's scheme, however, was really ingenious and ingenious, though it was ruthlessly nipped in the bud. He is the manufacturer of a medicine which he naively says "the soldiers greatly need in these hot countries." He believed that many good people in the United States would be willing to help our soldiers in Cuba through the Red Cross, and would do so if it cost each benefactor not more than a dime or so. Consequently he issued the first links in the chain, requesting each recipient of his letters to send 10 cents for 10 cents' worth "of the greatly needed medicine," and to forward two copies of this letter to two other benevolent individuals. He announced that his medicine was to be "distributed by the Red Cross nurses and the International Committee of the Y. M. C. A.," but these organizations sat down upon him hard, and thus he has lost this golden opportunity for fame and profit.

How to Enforce Early Closing.

Here we all have been for many years discussing methods to bring about early closing of drug stores. We have advocated unions among the druggists, the attainment of the desired end through the passage of special legislation, and a dozen other different ways, while all the time there has been a remedy at our doors, only we couldn't see it. This remedy has been applied in a Rhode Island town very recently. The authorities in that place have put into effect an order which requires that all stores, including drug stores, shall close at a certain specified hour each night. If this can be done in Rhode Island, it can be done everywhere and we suggest that wherever druggists wish they might close early, they consult with their city fathers and be compelled to take such action. As was to be expected, however, in the town under notice, some of the druggists are protesting against what they term the arbitrary action of the authorities. There is a class of people who never know when they are well off, and it seems that in this class are these kicking druggists of Rhode Island.

Too Many Liquor Sales.

Either the citizens of Topeka, Kan., are remarkably unhealthy lot, and find that whisky is the most potent medicinal remedy, or some druggists of that town are not particularly careful in their observance of the regulations concerning the sale of liquor. During the six months ending June 30, the thirty drug stores of Topeka made 12,100 sales of intoxicating liquor, according to the reports furnished to the probate judge. This gives a rough average of twenty-two sales per day for each druggist. We venture the assertion that there are extremely few reputable drug stores in the whole United States which, doing a very large prescription business, will find that their average daily prescription liquor sales are up to this figure. In fact, a half dozen sales would be high. It may safely be assumed also that the majority of Topeka's thirty druggists are law-abiding merchants and do not violate the liquor regulations, hence the inference is sure that the minority—the wrong-doing druggists, must have been conducting an enormous illegitimate liquor business. We have so often expressed our views upon this subject that it seems useless to repeat them, but we cannot help calling attention to the state of affairs in Topeka and gently inquiring if there cannot be devised some method to separate the black sheep from the white in the druggists' flock, and mete out to them a punishment to fit the crime.

The war tax has caused trouble for at least one man. He is the sheriff in an Ohio town who just prior to July 1 levied upon a couple of drug stores. He is now in great worry because of the revenue stamps he must stick on all the proprietary medicines before he can sell the stocks. Who will pay for these stamps, he plaintively inquires. They will not increase the auction value of the goods a particle. We sympathize with him.

* * *

It will be remembered that some time ago a Louisville firm of druggists obtained a \$1,000 verdict against a doctor in that city whom they accused of slandering them. But the doctor doesn't want to pay, and has been granted a new trial.

The Era Course in Pharmacy.

PRIZE WINNERS.

JUNIOR CLASS, 1897-98.

Below we print the list of prize winners in the recently finished examinations of the Junior Year. We append also an alphabetical list of the students whose grades entitle them to honorable mention. Several of the latter came so near the prize line that decision was a matter of considerable difficulty. The greatest care, however, has been exercised to deal fairly and justly with all, and, while some must necessarily be disappointed, it is hoped that such students will realize that the passing of the examination, considering the nature of the test and the high degree of scholarship which it implies, is of itself a reward well worth striving for, and an achievement to be proud of.

ERA SCHOLARSHIP PRIZE.

Sylvanus Jones (191),
Washington, D. C.

GENERAL PRIZES.*

For the highest grade in all subjects,
JUNIOR SILVER MEDAL,
To William Rentzheimer (433),
Hellertown, Pa.

For the second highest grade in all subjects,
THE WHITALL, TATUM & CO. PRESCRIPTION
BALANCE,
To Mrs. Leo Rosenblum (943),
Oakland Heights, Asheville, North Carolina.

For the third highest grade in all subjects,
THE PARKE, DAVIS & CO. MATERIA MEDICA
CABINET.
To George Graf, (918),
No. 4021 N. 25th street, St. Louis, Missouri.

For the fourth highest grade in all subjects,
LIPPINCOTT'S PHARMACIST'S LIBRARY.
To W. T. Isted (891),
Grafton, Illinois.

For the fifth highest grade in all subjects,
THE HENRY TROEMNER PRESCRIPTION BALANCE
To Harry R. Hermes (478),
No. 401 S. Ninth street, Richmond, Indiana.

For the sixth highest grade in all subjects,
LIPPINCOTT'S MEDICAL DICTIONARY,
To Walter Shumway (175),
Arlington, Iowa.

For the seventh highest grade in all subjects,
REMINGTON'S THEORY AND PRACTICE OF PHAR-
MACY.
To Kilby P. Sargent (61),
Foxcroft, Maine.

For the eighth highest grade in all subjects,
SADTLER & TRIMBLE'S CHEMISTRY.
To Charles M. Feicht (368),
Reynoldsville, Penna.

For the ninth highest grade in all subjects,
THE ERA FORMULARY.
To Arthur S. Cron (117),
Gallatin, Tennessee.

For the tenth highest grade in all subjects,
POTTER'S MATERIA MEDICA & THERAPEUTICS.
To William M. Kay (46),
Paris, Ontario, Canada.

For the eleventh and twelfth highest grades in all
subjects,
UNITED STATES PHARMACOPOEIA.
To Frank S. Brown (244),
Telford, Tennessee.
Albert E. Dodge (36),
Canajoharie, New York.

For the thirteenth, fourteenth, fifteenth, sixteenth and
seventeenth highest grades in all subjects,
THE PHARMACIST AT WORK.
To Wilmer M. Foley (80),
Ashland, Oregon.
Mrs. Maud Morgan (164),
Loda, Illinois.
Miss Lulu M. Hutt (619),
Waverly, Ohio.
George E. Southworth (111),
No. 10 Park Square, Boston, Massachusetts.
Sister Rosalie (852),
St. Joseph's Hospital, Philadelphia, Pa.

SPECIAL PRIZES.

For the highest rating in Pharmaceutical Processes,
THE WARNER GOLD MEDAL.
To Amos C. Cope (314),
Care of Nelden-Judson Drug Co., Salt Lake City, Utah.

For the highest rating in Botany,
LEHN & FINK HERBARIUM OF MEDICINAL
PLANTS.
To Albert Greenberg (128),
No. 15 Cooper street, Atlanta, Georgia.

For the highest rating in Pharmaceutical Physics,
REMINGTON'S THEORY AND PRACTICE OF PHAR-
MACY, with Author's Presentation Note.
To John F. O'Connell (555),
Colchester, Connecticut.

For the highest rating in Chemistry,
SADTLER & TRIMBLE'S PHARMACEUTICAL AND
MEDICAL CHEMISTRY
To Sara Mabel Riddell (723),
Wilbur, Washington.

For the highest rating in Microscopy,
UNITED STATES DISPENSARY.
To Edgar E. Masee (15),
No. 33 S. Second street, San Jose, California.

HONORABLE MENTION.

ALACOQUE, Sister M. (896).
ALBERT, Howard (231).
ALDHIZER, Henry H. (260).
ALEXANDER Bros. (589).
ALLEN, Sam L. (674).
ATTERBERRY, Marion O. (13).
BALABAN, Rudolf (140).
BANKER, P. Walter (666).
BANKS, Julia (846).
BARNES, James D. (5).
BARNESEE, Hosea (601).
BARNUM, William L. (251).
BARNUM, Charles E. (853).
BAUM, Hermann (263).
BECHTEL, John S. (908).
BECKER, John F. (879).
BEERS, Fred (644).
BENEDICT, Edward N. (136).
BENNETT, Lorenzo (129).
BENNETT, E. B. (978).
BICKFORD, Edward E. (621).
BLATCHLEY, G. L. (633).
BLECKNER, Noah H. (33).
BOEHME, Max Paul (639).
BOESSEL, Frederick (769).
BROOKS, Bert (432).
BROWN, Harmon C. (204).
BROWN, William J. (676).
BRUCE, H. Ervin (84).
BUCKE, Malcolm V. (489).
BUSH, John T. (431).
BUTTS, Mynard E. (601).
CALDWELL, W. T. (1005).
CARMOUCHE, Robert (29).
CHAMPLIN, Edwin P. (353).
CHRONISTER, Bert (216).
CHRISTIE, Isaac (589).
CLIFFE, Joshua (654).
CLOUGH, Walter R. (217).
COCKLIN, Frank D. (106).
CONE, Everett D. (105).
CONNER, Albert N. (652).
COOK, Francis X. (427).
CONRAD, Eugene J. (336).
CRAWFORD, G. M. (332).
CRAIG, C. H. (85).
CUNNINGHAM, T. F. (306).
DAVIS, Leroy J. (777).
DINGES, Eugene (207).
DOANE, W. W. (411).
DOYLE, George E. (96).
DUNKERSON, E. T. (341).
EASTERDAY, C. T. (155).
EDSILL, Edgar C. (327).
EILER, Charles R. (49).

* Figures in parentheses represent the students' matriculation numbers.

ELLIS, Clifford G. (741).
ERBAUGH, Arthur C. (545).
FEIG, Raphael (325).
FIELD, William C. (742).
FISH, Fannie L. (980).
FISHER, James D. (184).
FLAHERTY, Patrick J. (104).
FLECHER, George A. (1009).
FLEMING, John S. (69).
FOSTER, Mrs. W. (186).
FOSTER, Geo. K. (200).
FREDRICKSON, C. E. (206).

GALE, Shirley L. (506).
GARSON, Richard L. (316).
GEBHARD, Edward (841).
GERALD, Herbert T. (105).
GILBERT, Frank A. (406).
GILLILAN, J. P. (856).
GOEBRIG, Mrs. C. (63).
GRACE, Sisters Mary (851).
GRAHAM, James C. (919).

HALDOFFER, A. J. (110).
HAND, James E. (604).
HARRISON, T. F. (958).
HARTFIELD, A. E. S. (961).
HERMES, August (489).
HOOD, W. D. (424).
HOOPER, Viola M. (270).
HOWARD, Percy W. (41).
HOWELL, Charles (845).
HOYT, William H. (407).
JACOBS, Milton Palm (320).
JENKINS, George S. (406).
JOHNSON, Miss A. E. (312).

KELLEK, Charles (750).
KENAN, Fred (52).
KENDALL, Benj. F. (546).
KENNORTH, J. (580).
KEPHART, Philip (350).
KING, Milton H. (959).
KINNEY, Foster J. (74).
KLEIN, John W. (629).
KNAAK, Theodore J. (326).
KNOWLTON, Frank W. (951).
KOENIG, A. H. (133).
KOONTZ, Frank (561).
KREILING, Frank P. (107).

LA MONDA, Aid C. (818).
LANDON, Eugene (672).
LANG, J. C. (908).
LAWRENCE, W. (162).
LAY, J. R. (552).
LEHRMAN, Eldo R. (305).
LESTER, Leon T. (97).
LIGHT, Charles A. (212).
LINTON, Arthur W. (194).
LLEWELLYN, T. D. (469).
LONG, F. T. (282).
LOVELAND, John F. (370).
LUTZ, John E. (44).
LYON, Frances B. (974).

MACHELSON, Hume (114).
MARSHALL, Luther W. (103).
MARTEL, Charles C. (570).
MARTIN, J. M. (819).
MASON, Fred (400).
MATTHEWS, Rose (1001).
MAXWELL, Chalmers D. (34).
MILLER, FRANK E. (472).
MITCHELL, L. (345).
MOLITZ, Paul, (578).
MORRIS, Tandy G. (622).

MORRISON, Evelyn (189).
MCCARTNEY, Mrs. Martha A. (752).
MCCREARY, Fred N. (461).
MCMILLAN, W. E. (500).
NETBEIG, Charles J. (853).
NEWTON, Frank J. (406).
NILL, Herman (8).

ORDWAY, R. L. (67).
REMER, Rachel E. (55).

PARK, Charles (136).
PARSONS, Emily S. (732).
POKORSKY, Joseph C. (291).
POTTERVELD, A. (430).
POTTS, H. L. (457).
PRINCE, D. Malloy (127).
PUSHARD, Herbert E. (438).

RAFTER, Martin B. (135).
RICE, Miss Mollie W. (548).
ROACH, Thomas (118).
ROLEFS, Hermann. (114).
ROUSE, Fred. A. (200).
ROYDER, B. C. (882).
RUFF, Crawford T. (534).
RUBERT, Joseph F. (857).

SCHELLING, A. J. (870).
SEAR, George W. (770).
SEWELL, I. S. (111).
SHAFFER, Clarence E. (393).
SHAW, Fred. P. (320).
SHIRLEY, Mrs. Lulu (56).
SIMPSON, John S. (611).
SMALL, Robert C. (793).

SMITH, Carleton (750).
SMITH, Earl H. (82).
SMITH, Thomas S. (627).
SMITH, Thomas A. (909).
SMITH, William H. (365).
SNAVELY, Anna B. (3).

SQUIRES, Oliver D. (147).
STAFFORD, Peter P. (359).
STARRH, Thomas M. (476).
STEVENS, John V. (720).
STEWART, T. E. (55).
ST. JOHN, Robert (464).
STREAM, Austin (366).

STRIBLING, T. E. (534).
STUART, William J. (229).
SULLIVAN, James H. (701).
THATCHER, Charles E. (991).
THOMASON, W. P. (39).
THOMPSON, Robert (523).
THURPE, Elmer (400).
TINSLEY, G. S. (926).
TRUMAN, H. D. (462).

VALLEE, Charles A. (462).
VAN PELT, Frank S. (811).
VOLZ, Fred (937).

WALCH, George A. (303).
WALKER, James G. (449).
WATKINS, Daniel A. (546).
WEBER, Peter J. (154).
WELCH, J. (400).
WELCOM, Jacob C. (858).
WILHELM, George P. (638).

WINDROW, William H. (721).
WYCKOFF, E. E. (192).
ZANT, Rudolf (274).

to its efficient Director for the benefit I have derived from the course and it is my intention to continue on through the Senior Year. I trust that your efforts will meet with the same gratifying success in the future as in the past. The grandest achievement in human life is to do good in the world, and who can estimate the good which will come through the Era Course in Pharmacy?—E. W. WYCKOFF.

The benefit of the Era Course can best be understood by those who are fortunate enough to have the opportunity of pursuing it. I feel that your efforts will be the beginner the necessary information for which he is striving, and unawares leads him on to the fountain of knowledge. The clerk has simplified for him the complex questions of chemistry, and before he has time to reform the productions of a clear brain. I revel in the Pharmaceutical Physics and Processes. Lectures 7 and 9 hold very pleasant memories, and leave me benefited as well as ROSE MATTINGLY.

I can only speak of it (the Era Course) in highest terms of praise. I think it completely fills a long felt want of the drug clerk. How much I have learned cannot be estimated, perhaps little comparatively speaking, but it seems much to me. It has given me new ideas and ambitions. It has made me a systematic student of pharmacy, and I trust by hard work and application, I may be able to know something of pharmacy.—ANNA B. SNAVELY.

I am more than pleased with the Era Course in Pharmacy. Since beginning with you I have passed the Wisconsin State Board of Pharmacy for Licentiate with no trouble, and I am satisfied that I owe it to your lectures in the specialty in chemistry. I am again with the changes you propose, as we clerks are at all times very hard pushed for time, especially when the soda trade begins.—JOSEPH C. POKORSKY.

The course has been very beneficial to me. Some portions of the lectures have been read to pupils of the High School of San Jose and then the questions asked. Mr. Shumate, the principal, thinks they are fine. The course is clearly as well as interesting. It has done me good theoretically and practically, and you may be sure that I shall always try and remember its teachings.—WILLIAM L. BARNUM.

To tell of the benefit I have derived from the Era Course would require more space than I have. It is one of the grandest opportunities ever offered to young men to get a thorough foundation for a pharmaceutical education. I would not have missed the Junior Year for five times what it has cost me, and only hope that I can do as well during the Senior Year.—CHARLES T. EASTERDAY.

I as a clerk have received great benefit from the course, and for those whose time for study is limited, it is one of the best. It is an excellent introduction to a college of pharmacy as soon as possible, and think the lectures have been a great help to me. I recommend the Era Course to every beginner as a systematic and thorough course of home study, and I feel that a false idea held by many young men at this time that to pass a State board of pharmacy is all that one has to do to become a good pharmacist and run a successful business. In a progressive age like the present a man must be at the top in his line of business or he will not be a success. The Era Course is certainly a great guide and help. It is of unlimited value to the young man who never expects to have the opportunity of attending a school of pharmacy; of great benefit to the one who expects to attend school in the future, and of none the less value as a review for the one who has finished his college education and entered upon his career. I have even heard of a professor who is taking the course for the practice work. The gentlemen who have labored to make this course a success certainly deserve great credit for their undertaking. I am sure that every student who feels interested and applies himself will obtain great benefit from this course.—LEON T. LESTER.

The value of the Era Course to clerks and students cannot be estimated. Judging from my own experience, it has been of great value to me, and I think it of great value to all who cannot afford a course in a college of pharmacy.—F. W. HANKER.

It is certainly invaluable to the large number of drug clerks who cannot attend a college of pharmacy. It is by far the best course of home study that has ever been published, and I consider it second only to a course in a good college. I feel deeply grateful to the Era and

to its efficient Director for the benefit I have derived from the course and it is my intention to continue on through the Senior Year. I trust that your efforts will meet with the same gratifying success in the future as in the past. The grandest achievement in human life is to do good in the world, and who can estimate the good which will come through the Era Course in Pharmacy?—E. W. WYCKOFF.

The benefit of the Era Course can best be understood by those who are fortunate enough to have the opportunity of pursuing it. I feel that your efforts will be the beginner the necessary information for which he is striving, and unawares leads him on to the fountain of knowledge. The clerk has simplified for him the complex questions of chemistry, and before he has time to reform the productions of a clear brain. I revel in the Pharmaceutical Physics and Processes. Lectures 7 and 9 hold very pleasant memories, and leave me benefited as well as ROSE MATTINGLY.

I can only speak of it (the Era Course) in highest terms of praise. I think it completely fills a long felt want of the drug clerk. How much I have learned cannot be estimated, perhaps little comparatively speaking, but it seems much to me. It has given me new ideas and ambitions. It has made me a systematic student of pharmacy, and I trust by hard work and application, I may be able to know something of pharmacy.—ANNA B. SNAVELY.

I am more than pleased with the Era Course in Pharmacy. Since beginning with you I have passed the Wisconsin State Board of Pharmacy for Licentiate with no trouble, and I am satisfied that I owe it to your lectures in the specialty in chemistry. I am again with the changes you propose, as we clerks are at all times very hard pushed for time, especially when the soda trade begins.—JOSEPH C. POKORSKY.

The course has been very beneficial to me. Some portions of the lectures have been read to pupils of the High School of San Jose and then the questions asked. Mr. Shumate, the principal, thinks they are fine. The course is clearly as well as interesting. It has done me good theoretically and practically, and you may be sure that I shall always try and remember its teachings.—WILLIAM L. BARNUM.

To tell of the benefit I have derived from the Era Course would require more space than I have. It is one of the grandest opportunities ever offered to young men to get a thorough foundation for a pharmaceutical education. I would not have missed the Junior Year for five times what it has cost me, and only hope that I can do as well during the Senior Year.—CHARLES T. EASTERDAY.

BRIEF EXTRACTS FROM LETTERS OF ENTHUSIASTIC STUDENTS.

I regard the Era Course as a most valuable means of raising the standard of education among the new generation of those who intend to follow the practice of pharmacy. It is a great step toward the correction of a false idea held by many young men at this time that to pass a State board of pharmacy is all that one has to do to become a good pharmacist and run a successful business. In a progressive age like the present a man must be at the top in his line of business or he will not be a success. The Era Course is certainly a great guide and help. It is of unlimited value to the young man who never expects to have the opportunity of attending a school of pharmacy; of great benefit to the one who expects to attend school in the future, and of none the less value as a review for the one who has finished his college education and entered upon his career. I have even heard of a professor who is taking the course for the practice work. The gentlemen who have labored to make this course a success certainly deserve great credit for their undertaking. I am sure that every student who feels interested and applies himself will obtain great benefit from this course.—LEON T. LESTER.

The value of the Era Course to clerks and students cannot be estimated. Judging from my own experience, it has been of great value to me, and I think it of great value to all who cannot afford a course in a college of pharmacy.—F. W. HANKER.

It is certainly invaluable to the large number of drug clerks who cannot attend a college of pharmacy. It is by far the best course of home study that has ever been published, and I consider it second only to a course in a good college. I feel deeply grateful to the Era and

The Era Course contains the best lectures published in any paper. I have derived a great deal of good from them, as they are written in plain, everyday English, and can be readily understood. It has helped me very greatly in my position as an unregistered clerk.—**CHARLES S. THATCHER.**

I benefit very much derived from the Era Course. Lectures during the past year have been invaluable to me in my daily practical work. I am told by the senior members and prescriptionists of the firm I work for that the lectures are the best they have ever seen.—**JEROME STERNE.**

In my opinion the Era Course in Pharmacy is more than valuable to drug clerks and students who give it their attention. It is thorough and up to date. It is practical, and the plain and clear explanation of the lectures are such that the student gets down to actual business.—**J. F. LOVELAND.**

It affords me great pleasure to say that I have profited by the lectures of the Era Course. The Era in this great enterprise has done more for the drug clerk than words can tell. Permit me to express my thanks for the many kind acts extended during the Junior Year.—**E. F. GEBHARD.**

I think the course a very good one. It enables lots of young men to obtain an education in pharmacy that they could not otherwise secure. The changes proposed will add greatly to the value of the course, as most young drug clerks have but limited time for study.—**JOHN T. BRUSH.**

The Era Course is a great help to the student and to the registered pharmacist. It is inexpensive, thorough and comprehensive. To me it has been a pleasure, and a profit. Too much cannot be said of its value, and I am anxious for next year's work.—**J. S. SIMPSON.**

For those who cannot secure a college education, we unreservedly pronounce the Era Course a most excellent method of obtaining that knowledge and clearance of pharmacy should possess. For ourselves, we consider it invaluable.—**THREE SISTERS OF CHARITY.**

I like the way the Era Course in Pharmacy is conducted ever so much. I have enjoyed the lectures, and think they have benefited me much more than they cost. I hope you will have a large class, both Junior and Senior, next year.—**HENRY H. ALDHzIER.**

The course is certainly very thorough as well as practical. There is an encyclopedia of knowledge in the lectures. I give my best wishes for the success of the Era Course and the work it has undertaken as a pharmaceutical educator.—**E. T. DUNKERSON.**

I like the Era Course in Pharmacy very much, especially the lectures on chemistry. I thank you for your kindness, and wish you every success in the next year with your work, which I think is certainly a good thing.—**ESTHER NORMAN MONTAG.**

I am a student of pharmacy, that the lectures have been very satisfactory. You have given us much in little, as well as much for little. My best wishes for the Era Course, its director and contributors.—**LORRIZO EXANZ.**

I think no better aid can be extended to clerks outside of a college of pharmacy than the Era Course, and with the extended changes and improvements contemplated for the coming year, it will be perfect in every particular.—**EDGEE E. DOYLE.**

I cannot speak too highly of the Era Course. It has been of great value to me, and I look forward to next year's lectures with pleasure. I think the changes contemplated are good ones.—**EDGEE E. SOUTHWARK.**

I wish to say most emphatically that the course is of inestimable value to any person wishing a necessary insight into the art and science of pharmacy. I expect to continue the course next year.—**W. H. HOYT.**

I think this course a fine thing. It has brought me a good many hours of work when my time was almost completely taken up with other duties, but I am not sorry for this extra time.—**ABRAHAM E. SOUTHWARK.**

I consider the Era Course the most convenient and perfect way of overhauling the studies of pharmacy and its branches. Every explanation is easily understood and to the point.—**H. R. BAUM.**

I am very much pleased with the Era Course, especially in chemistry. On the whole, I am very well satisfied with the time and money I have spent upon the course.—**F. W. McCREARY.**

I am learning a great deal from the Era Course, and think it a very good way to become posted for State examinations, or as a preliminary to a college course.—**MILTON PAHN JACOBUS.**

The course is certainly a great boon for every pharmacist, junior or senior, and I am thoroughly pleased with it. I wish yourself and the course every possible success.—**J. ERWIN LUTZ.**

I am well satisfied with it (the Era Course). I regard it as very thorough and practical, and I heartily commend it to any drug clerk or student of pharmacy.—**ARTHUR E. LINTON.**

Every one intending to choose pharmacy as his vocation should be enrolled in the Era Course. Its advantages are unequalled for the fees.—**JOHN F. O'CONNELL.**

I have derived great benefit from the Junior lectures of the Era Course, and shall endeavor to make the most of them in the Senior Class.—**FRANK D. KONKIN.**

It (the Era Course) is simple and comprehensive. I value the course very much. It has been of benefit to me in many ways.—**EDWARD E. BICKFORD.**

I think it (the Era Course) most valuable. Different people to whom I have shown the lectures have expressed the same opinion.—**W. J. STUART.**

I advise any one who is going to pursue pharmacy as

a home study to take the Era Course, and he will surely come out on top.—**L. J. DAVIS.**

I for one am very much pleased with the Era Course, and can recommend it as a great help to apprentices and clerks.—**A. J. SCHILLING.**

I am well pleased with the course, and feel that I have been much benefited. I hope to be able to complete it.—**CHARLES E. PARK.**

It affords me great pleasure to commend the Era Course in Pharmacy. It has been of great benefit to me.—**MAYNARD E. TUTTIS.**

I think the Era Course of great value to clerks and students. It has been a great help to me.—**A. E. HAZFIELD.**

The lectures have done me a great deal of good, and I wish the Era Course the best of success.—**F. J. FLAHERTY.**

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

PATENTS ON MEDICINES.

Chicago, August 2.

To the Editor:

Behring succeeded in getting here in these United States what he could not get at home—a patent on antitoxin—and I do hope you will make a Dewey attack on this exhibition of "over-Behring" greed and gall.

So far the A. Ph. A. has done nothing, although I have fired my assaults on this monstrosity ever since 1890, when I returned from Germany and found that the antipyrin a friend had given me for seasickness could not be sold here nor swallowed by myself without royalty to the lessee. I have read papers and agitated till I got sick and tired of saying anything about it, and the sick citizens of these United States have paid millions of blood money to the men who did not even invent the synthetics.

When I read my paper on "Change the Laws" to the A. Ph. A. in '93, everybody applauded, but the applause faded away and sank into innocuous desuetude, as Brother Grover has it, and the grand old A. Ph. A. did not even pass the traditional whereases.

Later, bigger lights than the modest Chicago pharmacist have entered the arena, and got applause and whereases, but with what result?

My first suggestion was that each retailer in the U. S. should be urged to see his Congressman and explain the highway robbery, and ask him to change the laws so as to conform with civilized countries which do not grant patents on chemicals and in the healing art. Such cruelty is worse than Weyler's toward the reconcentrados and practiced only in these United States, that went to war for humanity's sake, but allow robbers 'o levy taxes on sickness. Not only that, instead of stimulating invention and enterprise, these United States put a premium on reaction and inactivity, for if you work hard and find a way to make these synthetics by a new process, these liberty loving United States forbid you to use that new process.

I hope you will pitch right in, and that this latest climax will act as it did with John L. when he stepped once too often into the ring.

W. BODEMANN.

DRUGGISTS SUFFER BECAUSE UNUNITED.

Chicago, August 1.

To the Editor:

I have been quite interested in the comments and discussion in the Era regarding the war tax stamp act. Like the farmer who locked his stable door after his horse was stolen, so the druggists, with great unanimity, complain of the hardships which we must endure through the operation of this unjust measure. Our wise (?) legislators always will select the sick and afflicted for special taxation for the reason that they are unable to make as vigorous a protest and poll as many votes against them as the able-bodied citizens. Unfortunately for the retail druggist, these wise (?) legislators, in their determination to hit the sick and afflicted, who cannot hit back, have been aided by the patent medicine manufacturers and the large manufacturers of pharmaceuticals, who advertise the retail prices of their goods, leaving no adequate margin for the retailer to cover the necessary losses and trouble for handling.

If (and that very large word of two letters always seems in the way) the druggists were united as the printers, brick layers or hod-carriers are, it would be very easy to control the manufacturers instead of being controlled by them.

If we were united, we would not spend half our time selling postage stamps and postal cards and using the telephone for the dear public who are unable to hear distinctly.

If we were united, nine-tenths of our number would not be complaining so bitterly of dull times.

But why am I writing this to you, who must get the same thing dinned into your ears every day.

T. H. PATTERSON.

HE THINKS TAXES UNNATURAL, UNJUST AND UNNECESSARY.

Burlington, Ia., August 1.

To the Editor:

"JULY 4, 1898" is the caption of a clear and cogent editorial in which taxation comes in for some remarks which I desire to respond to.

You say "The natural tendency of man is to evade taxes if he can." This is true—WHY? Because taxes are unnatural, unjust and unnecessary, at least among a self governing people; the one exception, if such it be, is what is commonly called the "single tax," but which is not a tax, but the taking of those rental values of natural opportunities which arise from the presence of population and the benefits of government, for the use of the government, local, State and National. Those rental values justly belong to their creator—the community and to the community they should go, in lieu of all unjust taking of the products of individual exertion which belong exclusively to the producer or his representatives. This must appear clear to all who will give the revenue question a little reasonable attention.

An impost on land values stays right where it is put. Should the landowner seek to shift it to a tenant the tenant would move away, for landowners would be competing with one another and tenants would have more opportunities for leasing or buying land than under the present system, which encourages land speculation and punishes industry, enterprise and public spirit by lightly taxing unused or illused holdings and increasing taxes on labor and its fruits, so that untaxed bonds are sought by investors, there being little inducement for capital to go into productive enterprises.

Taxes on personal property never were, never can be equitably collected, whether by means of paper writs and oaths or by the lash, the rack, the cross or the gridiron of the "Good old times."

J. HAGERTY.

ADVERTISING IN CATALOGUES.

New York, August 6.

To the Editor:

Druggists are persistently solicited for advertisements in the catalogues or private organs of various drug firms. One who has tried them begs to relate his experience. They usually state the cost per page for getting up their catalogues, say in a certain case \$25. Now it will be seen that this is quite misleading as applied to the advertising pages which may be added to the catalogue, and therefore amounts to practicing downright deception on the unwary advertiser. For instance, an issue, first edition, of 1,000 copies might cost for clerical labor, cuts, expenses, distribution, binding, etc., \$2,500. There being 100 pages, they are naturally estimated as costing \$25 per page. But this is not true as to the 100 extra pages of advertising. Though doubling the size of the book, they would increase the cost by only \$250. The issuance of catalogues is a necessary expense on the part of the wholesaler, and it is an imposition for him to saddle the expense upon some deluded advertisers, and there is even less justification in continuing the imposition through subsequent issues, which necessarily cost much less than the first. It savors of sharp practice, especially when you further consider that the inducement is insidiously conveyed that the firm in question will make a market for or at least supply if not push, the goods advertised. To strengthen this impression they have even taken the goods in payment. These they have been known to sell to the manufacturer's regular customers, shamelessly omitting to quote the goods in their prices or carry them in stock. Perhaps these were extreme cases, anyway they are liable to happen, and do not seem encouraging.

ONE OF THE BITTEN.

WHY IS THERE SUCH A DIFFERENCE IN THE EFFECT OF COCAINE MURIATE WHEN MADE BY DIFFERENT MANUFACTURERS?*

BY F. P. TUTHILL.

When looking up this subject, it is most natural that we should establish as a basis of any discussion the fact that the therapeutic activity desired when cocaine muriate is administered is due entirely to the cocaine muriate contained, that is to say, the anæsthetic effect which is desired from any preparation of coca leaves is dependent solely upon this particular alkaloid, to which the name of cocaine has been given. If the substance administered is cocaine muriate, without any trace whatever of any foreign substance, the effects produced will be of the highest attainable degree of intensity. This degree of intensity in effect will consequently be diminished in a ratio in exact proportion to the amount of any other substance, either inert or active, which may be present. The analyses and physiological experiments which have been conducted for years by eminent chemists and large cocaine manufacturers have proved beyond all doubt that the anæsthetic effect desired to be obtained by the use of coca leaves is due solely to the alkaloid cocaine. Admitting this fact, we are necessarily forced to the conclusion that when cocaine muriate which is sold by one manufacturer differs in the intensity of its action from cocaine muriate sold by another manufacturer, this difference is due to the fact that one brand contains more impurities than the other. Naturally you would ask: "Why do these impurities exist?"

There are several different ways in which cocaine is obtained from coca leaves. One manufacturer will use ether as a menstruum, another alcohol, and still another crude petroleum, each claiming much for his particular process. In comparing these several brands of cocaine muriate we find that the variance in the total cocaine alkaloid present will be from 90 per cent. to 100 per cent. This is easily ascertained by washing the alkaline solution with ether and allowing it to evaporate and the cocaine alkaloid to crystallize out as the solution evaporates. There will also be noticed during this comparison, the difference in color from perfectly white, which is the proper color, grey-yellow, to a light brown. In order we note a peculiar difference. It should be odorless, yet in some cocaine muriate a tobacco-like odor is faintly, or in some strongly, noticeable.

The next question you would ask is "Of what do these impurities consist?" One class of impurities is more or less harmless, but probably adulterate more than the other. I speak of the inorganic substances, such as sodium, potassium or calcium compounds, used in process of manufacture. The presence of these in small quantities may not be objectionable, in so far as physiological efforts are concerned, but they at least act as a worthless adulteration of a costly medicament and render exact dosage impossible. The removal of this class of impurities is easily accomplished, hence there is no excuse for their presence.

The secondary alkaloids form the other class of adulterants, although much more harmful. It seems to be generally conceded by authorities that coca leaves in their original green condition are possessed of not more than two, or possibly three, alkaloidal compounds. Some eminent chemists claim only one alkaloid is naturally present in coca leaves, namely cocaine. This may be true so far as leaves obtained from Iquianco or Bolivian coca are concerned, but in the case of Peruvian or Truxillo coca and from coca cultivated in Java and Ceylon there appears to be, besides the alkaloid cocaine, a certain amount of two secondary alkaloids, which have been designated "Cinnamyl-Cocaine" and "Isatropyl-Cocaine." Owing to the better flavor of the leaves, the Iquianco or Bolivian coca is more in demand by manufacturers for galeical preparations, consequently the Truxillo, being cheaper, is used in manufacturing cocaine; therefore these two secondary alkaloids are natural diluents. Cocaine in its natural condition as it exists in the coca leaves is readily decomposed into secondary alkaloidal

* Read at the annual meeting of the New York State Pharmaceutical Association, 1898.

compounds. These are often produced in drying the leaves, or through fermentive changes, which take place when baled and shipped. They are also produced by breaking down the cocaine during the process of purification and separation. We must, therefore, conclude that the preparation of a pure cocaine salt is not by any means an easy matter. If the manufacturer, through carelessness or lack of perfection in his process of manufacture, stops short of the total elimination of these alkaloidal compounds other than pure cocaine, he places on the market for pharmaceutical consumption a mixture which does not consist of a cocaine in a state of absolute purity.

In these days of highly perfected methods of pharmaceutical manufacture the presence of such diluents, even though harmless, is not to be condoned. Unfortunately some of these secondary alkaloids are possessed of very decided physiological action, and this of undesirable kind. This particularly applies to isotropyl cocaine, which tends to depress the heart and has absolutely no anesthetic action. Dr. J. M. Francis informed me that there is cocaine muriate on the market containing as high as 3 to 4 per cent. of this secondary alkaloid. A reliable test for detecting this objectionable body is known as MacLagan's Ammonia Test. The test mentioned in U. S. P., 1890, will prove the presence of both secondary alkaloids.

During the past year I have had a large experience with cocaine in dentistry. Formerly it was the practice of dentists to use cocaine in solution from 5 per cent. to 20 per cent. This was often very unsatisfactory, the dentist refusing to respond to the cocaine. Recently cataphoresis was fully developed, but it was found that the cocaine often used produced very serious results, which caused the dentists who were using the apparatus much alarm, not caring to become responsible, and not knowing where lay the trouble. My attention was drawn to this matter by Dr. Van Woert, a professor in the Buffalo Dental College, who is the inventor of this cataphoric apparatus. He had examined the various cocaines on the market and had decided on one particular brand, but wanted the cocaine in a definite amount and in a special form, which resulted in the cocaine cotton pellets, 1-5 grain, now so universally used.

You understand cataphoresis consists in forcing generally 1-5 grain cocaine muriate by electricity into the nerve of a tooth; so completely will it anesthetize the nerve that the tooth can be taken out absolutely without pain. This I can state from actual experience. What I wanted to bring out was this point. Imagine yourself a patient and your dentist using this small amount of cocaine containing 4 per cent. of this isotropyl cocaine. What might be the result?

I think we may sum up the whole question involved by the query taken as a text for this paper, by saying that the variation in the activity of various brands of cocaine as manufactured by different establishments, is due either to the presence of secondary alkaloids or decomposition products, or both, which are present originally in the coca leaves, or which are produced in the drug by the various manipulations to which it is subjected previous to or during the extraction of the desired alkaloid; that such undesirable constituents may be objectionable simply as diluents, or they may be objectionable because of harmful physiological action; second, that by buying only the highest grades of cocaine salts manufactured by houses of the best reputation, and furthermore, by subjecting these to tests which are well known to pharmaceutical students, there is no reason why anyone should be disappointed in the action of his cocaine salts.

WOMEN IN SCIENCE.—In 1894, Monsieur Rebifère, a French mathematician, delivered a lecture entitled "*Les Femmes dans la Science*," which was published in a small pamphlet of eighty-seven pages; this brochure he recently enlarged into a work of three hundred and fifty-nine pages, including more than six hundred names of women more or less distinguished in scientific pursuits. It is true that in order to swell the number the writer has included some names on insufficient grounds, and others about which he has no definite information; but the greater part of the book consists of short, well written biographies, giving interesting and valuable insight into the lives of the women of all ages and countries who have made useful discoveries or profound studies in the various branches of science. (Pop. Sci. Monthly.)

MINERAL RESOURCES OF CUBA.*

BY RAIMUNDO CABRERA.

[Translated from the Spanish by Louis Edward Levy, Member of the Institute.]

The receipt of the invitation extended to me by the honorable president of the Franklin Institute of Pennsylvania to present before that widely-famed scientific association an amplification of "Some Notes on the Mineral Resources of Cuba," previously published by me in the Engineering Magazine, affected me with two opposing impulses; on the one hand, the consciousness of my inability to do the subject its full measure of justice, and, on the other, my desire to prove my high appreciation of the honor accorded me.

The latter impulse prevailed, strengthened as it was by my natural desire, as a Cuban, to bring to publicity in the industrial centres of this great republic the incalculable riches which lie in the open lap of my teeming but unfortunate land, ungarnished and almost unexplored, after more than 400 years of European colonization. Thus suggested, my consideration of the subject will avoid a treatment of its technical, purely geologic or strictly scientific aspects, and will be confined to a brief review of data collected from official statistics and from various other competent and authoritative sources, sufficient to indicate the still incipient status of the mining industries of Cuba.

From the time when Cuba first attained any considerable degree of commercial importance it has appeared to the world as a country devoted almost exclusively to agriculture, and even in that branch as limited practically to the cultivation of sugar cane and of tobacco, and to the industrial manipulation of these products. As a source of supply for these two staples, in regard to both quantity and quality, Cuba has commanded universal recognition. But the mineral resources of Cuba, like many other of its rich, natural endowments, have been almost entirely neglected, notwithstanding that from the early stages of the settlement of the country, the location and extent of these mineral deposits have been definitely known. Scientific explorations by competent investigators, as well as by various industrial undertakings, most of the latter, indeed, tentative and ineffectual, have indicated the existence of these deposits at various points of the island. Quarries of white and veined marble, of granite and quartzites, have, in fact, been developed and worked to advantage, mainly, however, for merely local requirements. But besides these, there are to be found in various parts of Cuba, and only waiting to be developed, many of the most valuable metals and minerals of modern commerce. Placer deposits of gold and quartz lodes of silver have been worked in a more or less primitive fashion from time to time, since the days of Columbus. Of other metals and minerals which occur in workable quantity in numerous localities, the following may be mentioned: Copper, hematite, magnetite, manganese, asbestos, sulphur, talc, quicksilver, coal, antimony, feldspar, onyx, serpentine, gypsum, baryta, asphalt and petroleum. Specimens of all these, as well as of a variety of vegetable resins, were exhibited at the Amsterdam Exposition in 1883, and at the Columbian Exposition in 1893.

The causes which have resulted in the neglect of the mineral industries of Cuba are well and widely known, and are of such a nature as to be in detail beyond the purview of the present paper; but it may be stated in general that directly or indirectly the condition is due to the administration of the fiscal system of the country, which, with oppressive tax levies on all industries, on all articles of use and consumption, and especially on the importation of machinery and the exportation of products, has barred the influx of extraneous capital and labor, while repressing the development of the same at home.

In spite of all this, however, the fifteen years preceding the outbreak of the present civil war saw much material progress in the mining industry of Cuba. This was due to a partial relaxation by the home government, under the pressure of the liberal classes in Cuba, of the restrictions imposed on this industry. The introduction of important, though by no means adequate reforms in the

* Journal of the Franklin Institute.

system of taxation, which had militated so positively against its development, opened the way in this direction, and revealed a wide horizon of possibilities for the employment of capital and labor. Such, for instance, was the law of April 17, 1883, exempting the properties of iron mines from the land tax during twenty years, freeing the ores of iron from export duties, and relieving from import duties anthracite coal landed at the mining ports, and destined for use in the mining and metallurgical industries. There still remained, however, the heavy import duties on the machinery and appliances required in the work, as well as the port charges of 50 cents per ton on the ships engaged in the traffic, and these imposts prevented that extension of the iron industry which the removals of the other restrictions had seemed to promise.

Four years later (June 30, 1887) the above-mentioned concessions were extended to include the ores of manganese, zinc and lead, but were limited to the workings already registered, all new undertakings being required to pay the land tax.

Later again, by royal decree of July 7, 1892, the Spanish administration retraced its steps and reimposed a tax of 2 per cent. on the gross product of all mineral workings, eliciting the protests of the mine-owners that the sanction of the franchises previously accorded had led them to large expenditures on their plants, and that the new imposts would compromise them in their foreign contracts. These protests, however, were unavailing; the old tax system was gradually reimposed. The result was that for each hectare (2.47 acres) of area, the mining properties had to pay a tax of \$5 per annum, to which was added a surcharge of 50 per cent., making \$7.50. In addition to this there was the tax of 2 per cent. of the gross product, amounting to 1 per cent. per ton of iron ore, and 2 cents per ton of manganese, and this, apart from the local municipal tax levies. Thus were thwarted the efforts which were being put forth in Cuba in this important branch of human industry.

The minerals which had been more or less constantly mined in Cuba, up to the outbreak of the present revolution in February, 1895, were the following:

- (1) Asphaltum and mineral oils.
- (2) Copper.
- (3) Iron.
- (4) Manganese.
- (5) Gold.

The deposits of hydrocarbons, asphalt and mineral oils are extremely abundant and of excellent quality, both for fuel and lighting purposes. They are present in various conditions, solid, plastic and liquid, and several experts have affirmed "the existence at a great depth of very light oils, petroleum or naphtha." Of these, however, no definite investigations have been made, nor scarcely any examinations beyond such as are incidental to a very primitive stage of industry. On the Motembo estate, Province of Santa Clara, at a location named San Juan, borings were made in 1881, which resulted in discovering, at a depth of 95 metres, a deposit of naphtha of extraordinary purity, colorless, transparent as water, inflammable, leaving no residue after combustion, and of a density of 0.754, which congealed at a temperature of 55° C., dissolved asphaltum and the resins, and which was so volatile that its vapor at ordinary temperature could be utilized as illuminating gas. Nevertheless, this well was abandoned after the workings had reached a depth of 290 metres, although the supply continued at that depth.

A well similar to that at Motembo was discovered at Lagumillas, Province of Matanzas, from which, out of a source at a depth of 25 metres (82 feet) there overflowed a supply of 70 liters (18½ gallons) per day. This also has never been further explored or worked.

In the same Province, at scarcely a kilometer from the northern coast, there exists a deposit of bituminous shale impregnated with asphaltum of a high degree of purity, and in great abundance, whose workings, though favored by facilities of transportation, have also been abandoned. But even at the Bay of Cardenas, in the Province of Havana itself, there has been found a similar deposit: this latter appears, from contemporary mollusks and corals embedded in it, to be of comparatively recent geologic age.

In the rocks underlying a large extent of the bottom of this bay are great masses of asphaltum in a liquid

state, having in places a thickness of 70 feet, and quantities of this have been carried to market in New York, where it was highly appreciated for its purity, and was sold at prices varying from \$80 to \$120 per ton. The exploitation of these deposits in the layers at shallow depths was begun with considerable success, but the enterprise languished for want of facilities, and eventually failed entirely, through the fatal legislative interference inevitable in that unfortunate country, and the concurrent obstacles which develop in multiplicity under the vicious influence of misgovernment.

Asphaltum is to be found extensively in the Provinces of Havana and Pinar del Rio. In the former, there are being worked the mines of Potosí and Santa Rosa, distant half a league by rail from the harbor of Havana. The deposits exploited are embedded in the cretaceous marls, and the serpentines which are met with in the northern districts, the strata running generally northwest and southeast, in veins of about 6 meters. The material is earthy and impure, but is advantageously utilized as fuel in grates and ordinary stoves. The mineral is worked in a very crude manner, in the open air, and small quantities of the product have been exported annually. In Pinar del Rio are the Canas and Tomasitas mines, close to the beautiful bay of Mariel. These mines are notable for their size, the veins being 35 feet wide, and from 45 to 90 feet deep. They produce over 1,300 tons annually, destined for the use of nearby plantations, whose owners combine in working the deposits, the operations all being carried on in the open air. Asphaltum, or "chapaote," as it is called in the country, is very abundant in the Vuelta Abajo, where it commonly occurs spread on the ground, as it has been disengaged from the rocks. There are many smaller workings, among them that of Santa Helena, at Bahía Honda, which district contains unworked deposits of an asphaltum of great brilliancy and purity, which would doubtless be greatly appreciated in the market.

Copper has been mined on a large scale than any other of the mineral resources of Cuba, particularly in the Province of Santiago de Cuba, where it was extracted in large quantities until the disturbances of the revolution of 1895 put an end to the industry.

The town of Cobre takes its name from the adjacent mines, which attained celebrity for their great richness, and which were worked by a corporation known as the "Consolidada," with a capital stock of £40 sterling per share. These mines were discovered about the middle of the sixteenth century, but their working was reserved for itself by the Spanish Government, with the result simply of their being given over to various contractors, who, without capital or security, sought to profit by them without accomplishing more than keeping more competent agencies from attempting the work. Subsequent to 1833, and after much tribulation and expense, the Consolidado Company discovered some large and profitable lodes, and this not only gave that enterprise a great impetus, but also stimulated the inception of competing enterprises, one of which undertook the development of a number of mines, under the ownership of an English syndicate, with a capital of \$300,000, and named the Santiago Company.

The mines of Cobre, of which the machinery and out-fittings were destroyed by the insurgents during the so-called Ten Years' War, and the workings wholly abandoned, were subsequently acquired, during the succeeding interregnum of peace, by the Cobre Railroad Company, which energetically undertook the re-establishment of the plant. The company constructed five iron bridges, equipped the workings with tramways, rolling stock and locomotives, importing the material requisite for the purpose, but the efforts thus put forth remained unproductive, and the enterprise was practically abandoned, not by reason of any deficiency in the mines themselves, whose great productiveness is widely known, but solely because of the obstacles created by the administration and by the difficulties with which every enterprise in Cuba is overwhelmed in a struggle for existence against the insatiable hydra called "The Revenue." The exploitation of the mines has dwindled to a reworking of the tailings of the early rich outputs in the mounds of debris which cover the ruins.

Other veins are being worked in a more or less primi-

tive way, utilizing the waters which filter from the cavities of former workings, precipitating the copper by means of iron, and thus obtaining the copper in a refined state. Of this product 700 quintals were exported in 1885.

The cupriferous zone of Santiago de Cuba embraces three divisions: The district of Caney, that of the Cauto and the district of Cobre. The two former remained unworked, the owners of the mining rights appear to be content to preserve their franchises awaiting better times having assured themselves of the existence in their concessions of rich veins of native copper, and of its sulphides, oxides and other forms.

According to the able report of Señor Salterain, "quite superficial diggings have disclosed a ferruginous ridge of 8 meters width, traversed by veins of copper sulphide, copper oxide, carbonate of copper, copper pyrites and native copper, all the veins rich in mineral contents, and which at bottom are probably joined in a single lode of copper sulphide, as suggested by a study of the mines of La Caridad, opened in 1882, of those of Portes and others, and of the associated minerals."

In the province of Santa Clara mining concessions have also been allotted, notably at Malejas and at Nicaragua, which have been superficially worked, and which both Spanish and foreign investigators have pronounced as of great importance and promise. Finally, in the provinces of Matanzas and of Pinar del Rio, considerable copper deposits have been found, the mining of which, occasionally attempted by some crude worker, was always very soon abandoned.

To sum up, I may say, with regard to this subject, that while the discovery of veins of copper has proceeded with great activity in Cuba, as is evidenced by the large number of mining concessions which the Government has granted to individual proprietors (of whom in the district of Cobre alone there are more than fifty), this activity has been due primarily to the facility with which the deposits have been found. Furthermore, however, the general inactivity in exploiting the concessions has been caused directly by the public administration, in a country overburdened with onerous imposts on even the most minute details of industry. The land itself is a veritable mine of wealth, whose productivity is exhausted by the implacable voracity of the tax gatherer. No further comment is needed than the fact that in 1881 the export of copper amounted to only 35 tons.

Iron.—Nature appears to have endowed the Province of Santiago de Cuba with its greatest gifts of mineral wealth, and as in the case of copper, so likewise in that of iron, the most extensive deposits are found in that province. Large masses of hematite and of magnetite are there to be found, of which a number of deposits extend eastwardly at distances of from 12 to 50 kilometers from the city of Santiago, and about 6½ kilometers from the coast. Numerous mining concessions have been granted in this vicinity, divided into some sixteen groups, named respectively from the towns around which they centre; but, of all these concessions only three are being actually worked, and these by an American corporation, the Juragua Iron Company. This concern has undertaken operations of genuine importance in the mines named Juragua, not only as regards the mining itself, but also in the transportation of the mineral to the coast and the shipment of the ore to the wharves. For this purpose a railroad, several bridges and extensive wharves have been constructed at a point called Cruz, on Santiago Bay, where the ore is loaded into vessels carrying about 2,500 tons.

The success attained by this company, whose output has grown from 21,795 tons in 1884, to nearly 350,000 tons in 1898, stimulated the inception of other similar enterprises in the district of Santiago de Cuba, but, though on every hand the bowels of the earth were fraught with a rich store of mineral wealth, and its surface teeming with fertility, the proprietors of the many concessions which were sought and obtained, following the examples of the owners of the copper mines, have been content to guard their rights and to retain their holdings in the hope of a better governmental system, under which capital and labor would be attracted to the task of wresting its stores of wealth from the lap of this prolific, yet unhappy land.

A number of other corporations like that of Juragua

have been organized by foreign capital, notably the Spanish-American Iron Company, which has undertaken the building of a railroad of 6 kilometers length to the mouth of the Diquirí, and the establishment of dredging and other works, of an artificial port at that place, and the Sigua Iron Company, which has begun the working of several mines in the group of Arroyo de la Plata. The total exportation of iron ore from Santiago since the mines were opened in 1884 has been upward of 3,000,000 tons.

Manganese also is extremely abundant in Santiago de Cuba; numerous claims for the mining of this mineral have there been located, and a few of them recently put into operation. At Alto Songo veins of manganese dioxide (pyrolusite) are developed to a considerable extent in red jasper and metamorphic formations.

The mineral sites of Santa Margarita, Isabelita, Bos-toyo and other localities have revealed important deposits, though but slight effort has been given to develop them. The most notable workings at the present time are those of Cristo and of Ponipo.

In general, the manganese deposits are worked by the people, who take them under lease from the proprietors, paying a royalty of so much per ton. Thus, the mining of this mineral, so esteemed as to have been awarded a gold medal for its quality at the London Colonial Exhibition, proceeds on but a trifling scale, being, furthermore, restricted by the difficulties of transportation, which is mostly by means of wretched ox-carts over miserable roads. Everything is incipient, everything primitive. Many important mines have had to be abandoned simply because the cost of transportation to the place of shipment, though over but a short distance, made the product unavailable.

The manganese exported up to 1891 amounted to 34,308 tons, which obtained in the United States a price ranging from \$10 to \$14.35 per ton, according to its composition.

Gold, which abounds in the provinces of Santa Clara and Santiago de Cuba, has not, up to the present time, afforded any contribution to the public wealth or general industry of Cuba. All the various scientific explorations and individual prospectings which demonstrated the existence of important veins of this metal, have resulted in nothing, for lack of capital and means of operation, which are ever shy of undertakings in a country where the political unrest which has produced throughout the century such numerous catastrophes, has made all enterprise insecure.

In the district of Placetas, near Guaracabuya, there are a number of mineral sites of importance. Señor Fernandez de Castro, civil engineer, in a notable paper published in 1865, states as follows:

"In the mine of Guaracabuya the serpentine, which constitutes the subsoil, appears mottled with irregular veins, some of them quite marked, in which at a glance may be seen the particles of gold, disseminated on the surface in minute scales or nodules more or less connected." In 1865 explorations were renewed to determine the extent and depth of the gold lodes in Guaracabuya, and, according to the report made by Señor Salterain, mining engineer, these investigations indicated the existence of three distinct lodes. But the workings begun were soon abandoned, not only for lack of adequate means and appliances, but furthermore by reason of the revolutionary convulsions that began in 1868, and continued throughout the ten succeeding years.

A similar fate befell the mines of Las Meloneras and of El Descanso, in the same province, and those of Holguin, in the province of Santiago de Cuba. At the latter place, according to the reports of Señor Fernandez de Castro, of Leon Owen, an English mining engineer, and of other experts, there exist a number of gold deposits, among them that of Monte Verde, in the Guayavales section, where there are three veins that have been worked in former generations. These reports indicate that this region contains a number of separate auriferous lodes, which appear to afford assurance of continuance to a considerable extent and depth.

The value of the gold deposits in the island of Cuba has long been recognized. Several remains of ancient workings have indicated that these deposits were mined by the aborigines; historians of the discovery of the island have noted the gold ornaments which the natives

presented to the Spaniards, whom the quest for gold attracted with greater avidity to the neighboring continent, in Mexico and Peru, where they found it, mined and worked in more dazzling quantities, in the hands of the subjects of Montezuma and the Incas; but certain it is that while unfortunate Cuba retains rich veins of gold in its unexplored soil, its people have not yet seen a single coin of the precious metal obtained from that store.

Perhaps the future reserves for them a happier time! Besides the quartz veins referred to, there are to be found in the bottoms of ravines and mountain gleans alluvial or placer deposits of gold in considerable quantities. It has been stated that Don Vicente Guillem, jeweler of Holguin, with a single day laborer, obtained from these deposits gold sufficient for the requirements of his workshops.

Mines of various other minerals exist in Cuba, of which more than a brief mention need scarcely be made. Sixty kilometers distant from Santiago de Cuba there is a group of ten mineral sites, spread over an area of some 4,000 acres, the property of Don Julio Aurich, the mineral from which contains 34 per cent. of iron and 28 per cent. of manganese; these deposits are not worked. The mineral limonite (hydroxide of iron) is found in various deposits disseminated in Baracoa, where it has been discovered in strata in the ridges bordering on the seashore.

Chrome iron is also to be found in the same district of Baracoa, where three mining claims have been taken up. The analysis of the mineral from the Valhaur Mines, made in the Paris School of Mines, showed the presence of chrome oxide to the extent of nearly 55 per cent. Other mines of this mineral have been located at Mayari and at Sagua de Tanamo, in both of which localities it is very abundant. In Bayamo, in the precinct of Vavacito, there is a tract of 84 hectares (170 acres) of lead ore, and two other sites of this mineral in the same vicinity show veins of some 50 centimetres width, an analysis of which indicated the following:

	Per Cent.
Lead	46
Zinc	14.94
Silver, per ton	19 ounces
Gold, per ton	3 ounces

Of this mineral specimens were shown at the Chicago Exposition.

In the districts of El Cobre, precinct of Sevilla, there is a deposit of argenteiferous lead covering some 150 acres. The analysis shows the following:

Lead	45.73
Sulphur	16.45
Silica	10.38
Silver	0.39

Of this class of mineral sites numerous mining claims have been taken, all of which remain unworked.

Of asbestos, two mining concessions have been granted at Mayari, both covering 120 hectares (300 acres). This mineral also appears in abundance at Holguin, in the Nuevo Potosi gold mine, where it is found in fibres 20 centimetres long.

Of guano, immense deposits exist in the caves of Cuba. In one cave of the Cantivar group, on the south coast of Santiago de Cuba, the property of the Guimera Company, there is a deposit of from 4,000 to 5,000 tons, and the other caves are estimated to contain fully 70,000 tons. This company has built a railway to handle the product, which has been sold in New York at a price of \$7 per ton. Its cost for labor, carriage and transportation was figured at \$6.15 per ton.

An analysis of this guano gave the following:

Water	35.75
Potash	0.05
Ammonia	0.55
Phosphoric acid	19.60
Phosphate of lime	42.98

The granites and marbles of Cuba have also been worked to a limited extent. In the adjacent Isle of Pines, off the southern coast of the Province of Havana, the quarrying of some remarkably fine marble, both white and veined, was undertaken, and the product was regarded by experts as equal to that of Carrara and of Mexico; but the enterprise failed almost in its inception for want of laborers, as well as of means of carriage and of transportation to market.

Conclusion.—When it is remembered that in the Island of Cuba, where the production of sugar reached, in 1895, the fabulous amount of 1,100,000 tons, and where, nevertheless, this industry became ruined; where only a fifth

of the available land has been turned by the plough and the other four-fifths remain fallow, the fertile ground untouched by seed and given over to nature; when all this is considered, it is not at all astonishing to find that the mining industry has been unable, even with intelligent and earnest effort, to utilize the incalculable wealth beneath the soil.

There, where the mines are all of them at both a short distance from the coast, and from havens offering easy means of shipment; where numerous inlets, streams and other waterways afford abundant facilities for transit, where neighboring woodlands yield plenty of timber for building and other purposes; where the rigors of Winter are never felt, and where snow is not present on even the highest mountain peaks; where the heat of the tropics is mitigated by cooling breezes from the ocean, and where, in short, nature appears to have fairly poured its stores into the hands of men, there neither immigration nor capital take part, though neither would have remained indifferent to such attractions had there been an assurance of aught else than that, in the midst of all these natural resources, a due recompense for energy and effort could not be had.

What Cuba has lacked, and still is lacking, is that which is the condition precedent to any development of population and of wealth; a condition of political stability, one with which the people are in harmony, which affords to the citizen, to the immigrant and to capital, freedom and security.

New York, No. 72½ Irving Place, March, 1898.

HOW SPICES ARE ADULTERATED.

In these days of fierce competition and fraudulent dealing, adulteration has become an art in which a knowledge of science and the ingenuity of trade are freely exercised for deceptive purposes. Perhaps no ingredients lend themselves so readily to the manipulations of the "sophisticator" as spices.

People in general know so little about spice that it can be adulterated in the most wholesale and barefaced manner. It requires the trained skill of an expert to fully expose the many frauds that are perpetrated in the spice trade.

Pure spices (says the Delhi Morning Post) are debased for pecuniary profit by adding to them inferior or spurious articles or by taking from them one or more of their constituent parts. The practice has grown with present day competition in spite of the very severe laws prohibiting it.

It is not at all an uncommon thing to see ground spices sold at less than half the price of the unground article, a fact which sufficiently indicates that grinding is not the only process which the spice undergoes. It means, of course, that the ground spice has been more than doubled in its bulk by the addition of some cheap substance.

Some firms go so far as to advertise adulterated goods, and evade the law by calling them compounds. Ground ginger is adulterated with meal, rice, flour, starch, cayenne pepper, and manilla rope.

The true ginger-root has a very fine hair-like fiber running through it, and this is found in the ground article. Many people will not buy ginger unless they see the fiber, and bits of ground rope are made to take their place in the adulterated article.

The cayenne pepper gives the necessary pungency. Sometimes chrome yellow, a poisonous article, is used for coloring.

Cloves are adulterated by an admixture of the dried and ground twigs of the trees from which the cloves are gathered; also with ground coconut shells and pepper dust.

Allspice is also treated in the same way. Considerable cleverness is shown in the adulteration of cinnamon and nutmeg. Stale and broken biscuits, or damaged and common flour are baked in the oven, and afterwards ground up to a fine powder, and this is freely mixed with the ground cinnamon and nutmeg.

In adulterating mace, Venetian red is mixed up with this baked dust. Cayenne pepper is adulterated with meal, farina, coconut shells, Venetian red and salt, the whole being then ground up together.

(Special Correspondence.)

PHARMACY IN AUSTRALASIA.

Sydney, New South Wales, July 4, 1898.

Two years ago the College of Pharmacy (so-called) of the Pharmaceutical Society of New South Wales was closed through the dissatisfaction of the students at the manner of teaching adopted. Since then various schemes have been discussed for the establishment of a college on a comprehensive basis, but nothing tangible resulted. The society had not the funds necessary to build up a college on suitable lines. Within the last few months the council has been negotiating with the Sydney University for the efficient teaching of the students, and has now completed terms similar to the system adopted in South Australia.

The arrangement with the university sets out that the course of lectures which it is proposed shall be attended by students under the Pharmacy Board are the same as for the medical students. The subjects include botany, 40 lectures; inorganic chemistry, 40 lectures; organic chemistry, 40 lectures; practical chemistry, 30 hours; materia medica, 50 lectures; total fees, £12 13s. The course of lectures and the concluding examinations may be taken altogether in one year, or in two or three years, or a greater number, at the option of the student. Each lecturing term covers ten weeks. The annual examinations in all subjects are held in December of each year. Those who fail to pass in any subject may, if the examiners think fit, be allowed a deferred examination in March at an extra cost. Class examinations are held during the courses of lectures to test the progress of students. No certificates are given for these, but only for the regular annual examinations.

The Botany Syllabus for medical students will be somewhat modified for students under the Board of Pharmacy. About thirty lectures will be delivered, the same for both classes of students, and ten additional lectures will be specially adapted to the students of the Pharmacy Board. In materia medica there will be a special course to meet the requirements of the Board of Pharmacy.

In my last letter I told you of the trouble in the Pharmaceutical Society of New South Wales regarding the men who have been registered under the Pharmacy Act without passing any examination and who wish to become members of the Pharmaceutical Society. Their admission is strongly opposed by many properly qualified members of the society, while it is approved by others, and the divided opinion and outcome of the difficulty is the burning question of the hour in Sydney. A meeting of the members of the society was recently held, and a motion carried refusing those who are now known as the "D" men, membership. It was attended only by opponents of the "D" men—those in their favor would not attend. It was a matter for surprise that the supporters of the "D" men were absent, but the reason came out soon after the meeting. A cute pharmaceutical supporter had discovered beforehand that the meeting would be informal, and he passed the word along that he had satisfied himself of it by legal advice. And so it proved. After the resolution had been carried, refusing admission to the men who had not qualified by examination, the Council got legal opinion and discovered that the resolution was invalid, as the circular calling the meeting did not contain a specific motion. Another meeting is to be held shortly under valid conditions.

The difference of opinion on this question is so marked among master pharmacists that its influence has extended to the Pharmacy Board. This body is made up of members of the Pharmaceutical Society (barring the president of the Board of Health, who is the direct nominee of the Government). To-morrow, the 5th of July, the first elections of the Pharmacy Board under the new act takes place, and the two retiring members, who are strong opponents of the "D" men, are being opposed by two supporters of the unexamined class. Both parties have done a vigorous canvass of the members of the society, and circular literature has been flying about just like a Parliamentary contest.

A Melbourne tailor recently claimed £175 damages from a pharmacist for labelling a mixture of cascara (Perke, Davis & Co.) and liquorice, "teaspoonful" in-

stead of "teaspoonful." The chemist admitted his mistake. Plaintiff alleged that the overdoses of cascara caused considerable hemorrhage and put him to the expense of £98 for medical attendance, operations, nursing, etc., and kept him from work for two months. The action excited a good deal of attention among Melbourne pharmacists. Several medical men testified that the extra doses of cascara were responsible for the hemorrhage. On the other hand, medical evidence was called to prove that plaintiff, two years ago, had suffered from an abscess in the passage, and that the hard lumps brought down by the cascara had broken the cicatrix and caused the bleeding. They proved that the cascara did its work properly and was not really the cause of the bleeding. The pharmacist thereupon got a verdict with costs against the plaintiff.

The Queensland assistant pharmacists and apprentices are moving in the direction of an early closing system. The council of the Pharmaceutical Society are in sympathy with the movement, although they recognize the impossibility of delimiting the hours of employment.

Robert P. Greer, of the National Ammonia Company of the United States, who came to Australia a while ago, has erected an extensive factory at Clyde, close to Sydney, on the Parramatta River, and begun the manufacture of anhydrous and aqua ammonia.

A Sydney assistant pharmacist named Lionel Nell, who went to the assistance of a policeman in securing four desperate burglars, at the risk of his life, has been handsomely rewarded by the Government for his courage.

THE IMPORTANCE OF METHOD IN TEACHING MATERIA MEDICA.*

There are few men now graduates who do not refer to their studies of materia medica as a bore of the largest caliber, and when one considers the method, or rather the lack of method, by which the student was supposed to be taught in years past, one does not wonder at the universal comment. I remember well the large volume, the one or two lectures a week, principally a repetition of the matter in the book, and then the "demonition grind" for examination that meant an attempt to memorize several thousand words descriptive of several hundred drugs and preparations, any one of which might be asked on examination. There was no attempt to make the study interesting; no helpful hints as to classification or other aids to memory, and no private quiz, the student's quiz the only means of knowing how much or how little one really knew.

In the first place, to thoroughly familiarize the student with the United States Pharmacopœia is one of the most important duties of a medical student's Alma Mater. If he is to give drugs, he should know them; if he is prone to let nature do her part and only assist, so much the more must the practitioner know his drugs that he may the better judge what not to give. The feeling rampant in nearly every student's brain regarding materia medica is unusually formulated something like this: "What is the use of studying all these drugs; my preceptor has been practising for fifty years and only uses about thirty drugs." The reason for this is obvious to every practitioner, but few students realize the corollary to the fact that the older man had many more drugs in his list in his earlier days, and kept them there until experience taught him what he could discard safely; but neither he nor any other teacher has a right to lay down a certain list of drugs and say these and no others are of service. Every man should know his materia medica thoroughly, so that he can choose his drugs with a knowledge of what they may do when introduced into the human body; and how any one can urge the uselessness of many drugs, knowing how many conditions modify the action of drugs, is difficult to understand. In view of the addition of so many derivatives and artificial active principles, there is no doubt our next pharmacopœia could very well lose one-third of its present formidable array without being deprived of much valuable material; and it is easy to look far enough ahead to a time when the pharmacopœia will contain nothing but active principles and their preparations; but teachers have a problem be-

* A letter from Sam'l J. Fort, M. D., published in Phila. Med. Jour.

fore them now that has puzzled past generations, i. e., the adoption of a method of teaching a remarkably dry subject so that the student may learn the largest possible amount with the smallest possible expenditure of time and brain-effort.

Given a four years' course, with forty weeks in each course, a class that could not pass a most stringent examination in this branch should not be allowed to study medicine any longer, and I would not cut out one single official drug or its preparations, providing always it was taught properly. I firmly believe that poor teaching is responsible for the lack of interest in the study of materia medica on the part of students. No man should undertake to teach such a branch whose love for it is not so strong as to impart some degree of enthusiasm to his class. A man, however well equipped, who goes to a class-room, recites several pages parrot-fashion about a certain number of drugs and their preparations, and leaves the room thanking Providence that another hour has passed, ought to give up his branch. Enthusiasm, however, does not cover the entire ground; there must be a method, and I believe that Dr. Geo. H. Rohé, Professor of Materia Medica and Therapeutics in the College of Physicians and Surgeons of Baltimore, has formulated a practical method of teaching this entire subject.

Having started a four-year's course this college early recognized the necessity of establishing up-to-date methods of teaching all branches of medicines, but in no one branch was any greater improvement made than in materia medica and therapeutics. First, the two branches were made four viz., materia medica, pharmacy, pharmacology and therapeutics, the course, however, being completed in three years. In the first year the men get a series of lectures that gives them a thorough set of notes, covering every official drug and its preparations. This occupies about half the course, the remainder being occupied three hours per week in a quiz that drills, preparations and doses, natural orders, botanical names, active principles, habits, etc., until even the drones begin to learn something; and it is not only amusing but instructive to see the growing interest in the work as the students begin to realize that their efforts are bearing fruit. The foundation principle of this method is, first, to present the subject in a manner that will give the student a chance to learn methodically, a quality in which almost every text-book in the market is wanting, whether quiz-compend or the more pretentious volume on the subject. Not one book treats materia medica from the student's standpoint; the matter therein is suitable for the graduate, but the first-year man comes to these studies many times fresh from the plow, or at least without preliminary knowledge that will enable him to choose from these portentous volumes all that he must have, not only to pass his college examinations but those put up for him by erudite State Boards. These books are all right as authorities, even though the differences in dosage are enough to make even the greenest student wonder which is correct, they are all right as encyclopedias from which lots of good material can be drawn but the poor student has neither time nor experience to enable him to digest this and assimilate it. To further this object the Baltimore college has had prepared an interleaved syllabus to be used as a note-book containing such essentials that, combined with what the student gets from his instructors' talks and the subsequent quizzes, he will have a *vade-mecum*, systematically arranged, easily learned, and a volume that will be of value to him at any time later when he wants to rub up.

Now, having a thorough acquaintance with the pharmacopœia, the student, in his second year, has a course in pharmacy, in which his knowledge of preparations and doses is further drilled into him and supplemented by practical training in the ordinary manipulations of the drug store, with drills in prescription writing. During this year he is taught the toxic and the physiologic actions of drugs, and in his third year he comes to the study of their therapeutic application with some ability to know what his teacher is talking about. This didactic course in pharmacology also covers about half a year. Then comes another half year of quizzing.

It is not claimed that improvement cannot be made; only that steps have been taken away from the beaten

track of the past, and some attempt made to get down to the level of the student, instead of firing over his head, and trusting to spent shots to make an impression. He is treated as a student, not as an intellectual prodigy, whose mental processes are capable of assimilating any amount of instruction, no matter how applied.

Attention has been called to the fact that few, if any, text books on the subject of materia medica are of value to the student, from a teaching standpoint, and the thought comes: Why is not our Pharmacopœia, the authority by courtesy of our text-books, made the standard text-book of the United States? Why should it be confined to a mere working standard for the pharmacist? Would it not be easy to arrange the official drugs under their natural orders, give the botanical names, common names, habitat, active principle or principles, preparations, and doses, including in the dose, the amount in minims or grains, etc., by the metric system as well as the old style, and the maximum daily dose? Both teachers and students would then have a standard, and much time could be saved from mere didactic work and given to class-recitations, which, after all, form the only true method of teaching a subject that a man, to learn, must exercise his memory, without regard to judgment or reason.

The fact that every graduate must pass a State examination in materia medica brings this matter home with still greater force, for the questions asked in these examinations are not, as a rule, practical every-day questions, aiming to find out whether the applicant being examined knows enough to practise medicine, but apparently to find out what he does not know, and any one acquainted with the range of the present Pharmacopœia can readily understand how easy it is to ask questions whose answer would puzzle even a teacher. A question given out in the last Maryland State Board Examination was, "What is Elaterium, its preparations and doses?" This may have been a misprint or a joke. In any event, however, it was in bad taste, as the drug is not official and has no official preparations; and if a State Board condescends to ask such a question as a "catch" question, reform is not only needed in teaching materia medica, but in the personnel of such boards.

CORONUM IN THE EARTH.—Prof. Nasini, of Padua, Italy, has communicated to the French Academy the results of his investigation of gases issuing from the earth in volcanic districts. Among these gases he found coronium, which has hitherto only been known hypothetically as a constituent of the sun. Coronium seems to have a vapor density far smaller than that of hydrogen. Prof. Nasini's investigations suggest the probability of the presence of other new elements. Prof. Schuster, from an examination of the spectrum of "metargon," is inclined to doubt that it is a new element. He thinks it is a mixture of the components of the atmosphere which solidifies at the temperature at which air liquefies. (Sci. Am.)

THE CAUSE OF THE AURORA.—As long ago as 1580 and 1590, Tycho Brahe observed that the appearance of these polar bands and halos coincided with the presence of spots on the sun. Klein, in our own day, comparing twenty-five years of observations made with the greatest care at Cologne by Dr. Garthe, has confirmed the fact that these high cirrus clouds and polar bands follow as to their frequency the same laws as the spots on the sun; they succeed each other or even coexist. Many observers of the aurora are of the opinion that the appearance of the aurora depends on the presence of these clouds in the sky, which are in turn due to magnetic disturbances of the earth's photosphere originating in the sun spots. There are other evidences that the aurora is intimately connected with material particles in the atmosphere, like clouds and fog; for instance, when two or more rays in an aurora cross, the light is augmented, or when an aurora makes a fold on itself as in drapery forms, showing that there are two material "thicknesses" of the substance; moreover, the wind also acts on the aurora, which is torn after a tempest, showing that the wind has acted upon luminous clouds which are part of the aurora; finally, the presence of clouds seems to favor the formation and development of auroras. So there is an intimate relation between them. (Pop. Sci. Monthly.)

PHARMACY.

COPYING INK.—A good formula is stated to be the following: Aniline-blue 30 parts, water 2000 parts, glycerin 1000 parts, alum 15 parts. To obtain good copies, it is sufficient to place the letters between the leaves of an ordinary copying book and simply close the book. (Sudd. Ap. Ztg.)

VERATRINE OINTMENT.—To avoid the disagreeable irritation of the mucous membranes of nose and throat from fine particles of veratrine in the air, during preparation of the ointment, Fiehnner proceeds as follows: The alkaloid is moistened in a capsule with a few drops of castor oil, sufficient alcohol added to effect a uniform division or a solution, and then the ointment base incorporated. (Sudd. Ap. Ztg.)

SOLUBLE METALLIC GOLD.—Of aqueous solutions of metals only that of silver has hitherto been prepared. When silver is liberated under water in an extraordinary fine state of division, the silver does not separate, but forms a colloidal solution. Zsigmondy has succeeded in preparing a similar solution of gold in the following manner: A very dilute solution of gold chloride is rendered feebly alkaline and treated with formaldehyde. On concentrating the solution in a dialyzer, the gold remains in solution. The salts contained in the solution may be partially removed in the same manner, since the gold is incapable of penetrating the membrane. (Ap. Ztg.)

GLUCO-PHENETIDID AND GALACTO-PHENETIDID.—Glucose or galactose is heated in alcoholic solution with para-Phenetidin on a waterbath. The resulting condensation-products are similar in chemical and physical properties to the corresponding compounds of anilin, but differ from them in having decidedly less toxic effects. Gluco-phenetidid crystallizes from alcohol in shining, snow-white needles, which melt on rapid heating at 160° C. It is sparingly soluble in cold, easily in hot, water, very sparingly soluble in ether, moderately in cold, and very soluble in boiling, alcohol. Silver salts are readily reduced by it in aqueous solution. Galacto-phenetidid behaves similarly; it crystallizes in well defined prisms, which melt at 165° C. (Ap. Ztg.)

INCOMPATIBILITY OF SALICYLIC ACID, NAPHTHOL AND RESORCIN.—According to Prot. Vitali, these three substances, when in solution together, must be looked upon as physically incompatible. From a solution containing 1 Gm. of each of the substances in 300 Gm. of hot water, prepared after a prescription, a yellowish-white precipitate, resembling mother of pearl in appearance, separated on cooling. This was found to consist of about two-thirds of the salicylic acid taken and a little naphthol. (Ph. Post.) (In accordance with the solubilities given in the U. S. P. about one-third of the salicylic acid and seven-tenths of the naphthol should have precipitated on cooling. The incompatibility is not apparent. —Translator.)

MANUFACTURE OF OXALIC ACID.—The following process has been patented: Sawdust or other material consisting largely of cellulose is first dried and then freed from air by heating at 70° C. in a vacuum. Hot alkali solution is then admitted into the vacuum apparatus and the mixture heated to 150° C., the vacuum being maintained and the progress of the operation controlled by digital examination of samples. At the end of the digestion an oxidizing agent, as hydrogen dioxide, sodium dioxide, or air, may be admitted. The product is dissolved in water and treated with lime, whereby a nearly white calcium oxalate is precipitated and alkali liberated, which is used again. By treating the oxalate with sulphuric acid in the usual manner, and once crystallizing the liberated oxalic acid, a white, marketable product is obtained. (Ap. Ztg.)

HAIR DYES.—Dr. Hefelmann has recently analyzed a number of preparations, of which several consisted of ammonium sulphide solution and ammoniacal solutions of silver nitrate in separate bottles, to be used together. Another preparation proved to be a solution of 3 per cent. of vanadic acid in a strongly ammoniacal solution of ammonium vanadate. (Ph. Post.)

BORIC ACID IN WINES.—P. Carles points out that boric acid is present in many wines in notable proportions, and that it is found more frequently in white than in red wines. This is partly due to the fact that the clarifying agents generally employed, e. g., gelatin and isinglass, tend to putrefy unless an antiferment is present. For many years H₂SO₄ has been used for this purpose, but among its disadvantages it deprives red wines of their color, and is readily detected by its odor. Another reason for the use of boric acid is the demand for sweet white wines, hence its addition in order to check fermentation at a certain stage in the process. It is, of course, open to question whether, from a hygienic point of view, the use of boric acid is permissible in articles intended for human consumption, on account of its antiseptic properties. (Rep. de Pharm. Pharm. Jour.)

iodo-THYMOL-FORMALDEHYDE is a new compound that is expected to find application as an antiseptic. The following is the patented method of preparation: 100 Gm. of thymol are warmed, under stirring, with 100 Cc. of 40 per cent. formaldehyde and after a time 100 Gm. of concentrated hydrochloric acid added, which causes the separation of a viscid oil, that solidifies to a crystalline mass on cooling. This is powdered and thoroughly washed, to remove impurities. The result is thymol-formaldehyde, which is iodized in the following manner: 42 Gm. are dissolved in 50 Cc. of alcohol. 12 Gm. of potassium iodide and 33 Gm. of iodine added and the mixture warmed gently for an hour. After cooling an excess of ammonia is added, which precipitates the new compound. The precipitate is thoroughly washed and dried. (Sudd. Ap. Ztg.)

DESTRUCTION OF ANTS.—The following practical hints are given in *Drog. Ztg.*: (1.) A simple method consists in placing at night a few lumps of sugar into places frequented by the ants, and killing the insects that have collected about the sugar, the following morning. (2.) Mix powdered or granulated sugar with a little yeast and place it in the way of the insects. (3.) Honey is mixed with a little tartar emetic and the poisoned honey exposed on plates, or pieces of sponge or cloth are saturated with it. (4.) A mixture of 2 parts of honey and 1 part of yeast may be used in a similar manner as the preceding. (5.) Sprinkle about a mixture of powdered calamus root and carbonate of ammonia, or a mixture of table salt and borax. (6.) Water in which fish have been cleaned, thrown into their places of habitation, is said to be effective after two applications. (7.) Alum sprinkled about the paths of the insects, across the sills of doors and windows, etc., will drive them away and keep them out of houses.

GOLD EXTRACTION WITH POTASSIUM PERMANGANATE.—A new process for the extraction of gold has been tried with success in the gold districts of New Zealand. The finely powdered auriferous ore is first mixed with common salt and sulphuric acid, and potassium permanganate is then added in solution. Hydrochloric acid is formed by the action of the sulphuric acid on the salt, and from this chlorine is liberated by the permanganate. The chlorine then combines in the nascent state with the gold, forming soluble gold chloride. The new method is said to have many advantages over the cyanide and amalgamation processes. The chemicals used are harmless, non-poisonous, and cheap, and the extraction of gold from the ore is nearly complete. A particular advantage lies in the fact that the process can be applied to ores containing copper for which the cyanide process cannot be used. A gold mine at Mount Morgan, New Queensland, obtained by the permanganate process 95 per cent. of the gold present from ore yielding only 20 per cent. by the cyanide process. The ore contained also copper, iron, antimony and manganese. (Sudd. Ap. Ztg.)

PRESERVATION OF RUBBER.—The hardening and breaking of rubber are prevented by a patented process, which consists in mixing the crude rubber before vulcanization with a plastic mass prepared from glue, rendered insoluble in water, and vulcanized oil. An aqueous solution of glue is precipitated with tannic acid or other means and the resulting plastic mass mixed with 0.1 to 0.5 its weight of vulcanized oil, which greatly increases the miscibility of the two materials, particularly when the vulcanized oil has previously been macerated with oil of turpentine or benzine. The mixture is carefully dried and mixed intimately with the rubber, or rubber composition. The proportions of materials depend upon the condition and quality of the rubber mass. (Ap. Ztg.)

PREPARATION OF CHLOROFORM WATER.—According to M. Mansier, a solution of chloroform, containing 0.8 gram per litre, placed in a stoppered flask two-thirds full, if maintained at a temperature of 12° to 14° C. without shaking, will be found, after a fortnight has elapsed, to contain only 0.4 gram of chloroform. If chloroform water of the same original strength be placed in a flask three times as large as is necessary and examined after it has been violently shaken several times, it will be found to contain 0.6 gram of chloroform. Hence, the quantity of chloroform necessary to fully saturate air being known for all temperatures, it is easy to prepare a solution of definite strength and better keeping qualities. The proposed formula directs that 4.6 grams of chloroform, previously weighed in a small flask, be added to 900 grams of distilled water contained in a liter flask, and the whole agitated until globules of chloroform disappear. It is calculated that the air in the flask will be saturated by 0.1 gram of chloroform, leaving a solution containing 0.5 gram per 100 grams. The product should be preserved in full vessels. (Journ. de Pharm. et de Chim., Pharm. Jour.)

OINTMENT FORMULÆ WITH LANOLIN AS VEHICLE.—The manufacturers of Lanolin-Liebreich have issued a collection of formulæ for dermatological purposes, in which lanolin is used to advantage. A few of them have been reproduced in Ph. Post.—For acne: Resorcin 10 p., zinc oxide, starch, of each 25 p., lanolin to make 100 p.—For rosacea: Ichthyol 10 p., salicylic acid 2 p., lanolin 50 p. or Lanolin 5 p., vaselin 10 p., solution aluminum acetate 20 p.—For eczema capitis: Ichthyol 3 p., lanolin 5 p., benzoated lard 10 p., distilled water 12 p.—For eczema faciei: Lanolin 10 p., vaselin 20p., solution calcium chloride 40 p., pyrogallol 1 p., oil lthantrac. 5 p.—For eczema genitalium: Lanolin 5 p., vaselin 10 p., carbolic acid 1 p.—For erysipelas: Ichthyol 15 p., distilled water, lanolin, of each 25 p.—For favus: Oil of each 2.5 p., resorcin 5 p., salicylic acid 2.5 p., precipitated sulphur 10 p., vaselin, lanolin, of each 15 p.—Herpes tonsurans: Cinnabar 1 p., sulphur 25 p., lanolin 75 p.—Impetigo: Vaselin, lanolin, of each 50 p., zinc oxide 20 p., salicylic acid 2 p., lead acetate 1 p.—Chilblain: Camphor 1.5 p., balsam Peru 0.5 p., oil of almond, lanolin, rose water, of each 10 p.; or zinc oxide 15 p., glycerin 5 p., lanolin 40 p.—Tetter: Chrysarbin 25 p., lanolin 75 p.

ALCOHOLIC FERMENTATION WITHOUT YEAST CELLS.—Euchner and Rapp report in Chem. Ztg. upon the preparation of dried yeast-juice. Their method is as follows: 500Cc. of the fresh juice are allowed to flow gradually into a large flask containing a few drops of olive oil and connecte. with a Soxhlet's vacuum-apparatus. The liquid is rapidly concentrated at 20° to 25° C. to a syrupy consistence, which requires about ¼ hour with an effective water vacuum-pump. The syrup is distributed in thin layers upon glass plates, which have been cleaned with ether, and dried at a temperature not exceeding 35° C. On the following day the product is removed from the plate, powdered and again dried over sulphuric acid in a vacuum exsiccator. The result is about 70 Gm. of a powder having an agreeable odor of yeast and almost completely soluble in water. On dissolving the powder in water in the proportions it is contained in the original juice, a liquid is obtained which has the same power of fermentation as this. This was shown by experiments with sugar, made in presence of toluol, or in some cases potassium arsenite. With the latter, however, several irregularities were noticed. (Ph. Post.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Information Wanted.

(J. McK.) Lanolamyl or Lanolamylol; where and by whom manufactured?

Compound Syrup of Hypophosphites.

(B. H. W.) The National Formulary furnishes a very satisfactory process for the preparation of compound syrup of hypophosphites, if care be taken to use pure hypophosphites, and in properly preserving the finished product. Hypophosphites in solution are very susceptible to the action of light and air and a syrup containing them is best preserved in small bottles of amber or blue glass, securely corked and stored in a cool place. The fermentation you report is probably due to a lack of these precautions. The reaction of the syrup made with hypophosphorous acid is acid, of course, but it does not necessarily increase the tendency to fermentation. The process you describe is substantially the same described in this journal, March 17, 1898, page 402.

Succus Cineraria Maritima.

(G. B.) The juice of *Cineraria maritima* has been successfully used for the removal of cataractal blindness, it is claimed, by dropping into the pupil of the eye two or three drops three times daily. In its application to the eye it is said to produce no irritation or inflammatory action beyond a slight burning which lasts only a few minutes, accompanied or followed by profuse lacrymal discharge, tinged with the coloring matter of the liquid used, "while its therapeutic properties are solvent." *Cineraria maritima* was first brought to notice by Dr. Mercer, in a letter to J. H. Hart, superintendent of the Royal Botanical Gardens, Trinidad, and published in the Pharm. Journ. and Trans. 1888, page 985. An article on the use of this substance in the treatment of cataract was published in the July 1, 1891, Era, page 10.

Hospital Men in U. S. Service.

(F. C.) For particulars regarding hospital stewards in the Marine Hospital Service, see this journal, January 20, 1898, page 97. For information relative to appointment in the Hospital Corps attached to the Medical Department of the Navy, see Era, June 30, this year, page 993. Appointments in this service as pharmacists are filled from the lower grades by the Secretary of the Navy. As recently amended, the law provides for the appointment in this Corps of twenty-five pharmacists as warrant officers. Pharmacists in the army are detailed from the ranks of the enlisted men and capable men stand a chance of becoming hospital stewards and receiving a salary of \$45 per month. The supervision of this service in the army is under the direction of Surgeon-General Sternberg, Washington, D. C. You can enlist for this work, if you are eligible, at the nearest recruiting office, where full particulars may be obtained.

Wild Cherry Phosphate.

(L. L. S.) A "phosphate" syrup may be made by simply adding 2 to 4 fluidounces of solution of acid phosphate to one-half gallon of wild cherry syrup (as prepared for fountain use), and then drawing the latter into the glass without the further addition of acid solution. Here are some other formulas.

(1) Almond essence	2 fl. drams
Solution of acid phosphate	2 fl. ounces
Compound tincture of eucubar	1 fl. dram
Syrup, enough to make	1 quart

- (2) Oil of bitter almonds (deprived of hydrocyanic acid) 4 drops
 Alcohol 2 fl. drams
 Dilute phosphoric acid 2 fl. ounces
 Syrup 15 fl. ounces
 Glucose syrup, enough to make 32 fl. ounces
 Caramel, sufficient to color.
- (3) Fluid extract wild cherry 2 fl. drams
 Tincture of cudbear 2 fl. drams
 Port wine 4 fl. drams
 Cognac brandy 4 fl. drams
 Solution acid phosphates 2 fl. ounces
 Syrup, enough to make 32 fl. ounces

Various other formulas may be found in previous volumes of the Era. Consult the indexes.

Black Ink.

(J. S. C.) The following formulas are selected from a number in our files:

- (1) Sulphate of iron 1 ounce
 Logwood 1 ounce
 Gall nuts 3½ ounces
 Gum arabic 6 ounces
 Pulverize each separately, mix, and add:
 White wine vinegar (or acetic acid) 1 quart
 (2) Pulverized gall nuts 100 parts
 Sulphate of iron 350 parts
 Gum arabic 200 parts
 Water 6000 parts
 Creosote, a few drops.
 (3) Extract logwood 15 parts
 Carbonate of sodium, crystallized 1 part
 Neutral chromate potassium 1 quart
 Water 1000 parts
 Dissolve the extract in 900 parts of water, allow it to deposit, decant, heat to boiling, and add the carbonate of sodium; lastly, dissolve the chromate of potassium in the remainder of the water, and add to the logwood solution drop by drop with constant stirring.

A black ink may also be easily prepared by dissolving a suitable amount of black aniline, or atramine, in water. The solution, however, should not be of such a concentration that the writing when dry shows a metallic luster. To give the ink the required body add a small quantity of glycerin.

Red Ink.

(J. S. C.) Writing executed with red ink becomes faded in the course of time, and none of these inks is as durable as black ink made with sulphate of iron and tannin (nutgalls): However, we append several formulas:

- (1) Carmine, No. 40 30 grains
 Ammonia water 1 dram
 Acacia 6 grains
 Water, q. s. to 1 ounce
 Dissolve the carmine in the ammonia, and add the other ingredients. The depth of tint may be varied by the use of more or less water.
 (2) Half a dram of powdered drop lake and 18 grains powdered gum arabic, dissolved in 3 ounces ammonia water, make one of the finest of carmine inks.
 (3) The Era Formulary is authority for this one: Rub 6 parts of red carmine with 75 parts of liquid water glass. Dilute this mixture with 675 parts rain water. Let it stand a few days, and pour off the fluid.

Scarlet Ink for Steel Pens.

- (4) Aniline crimson 1 ounce
 Water 1 gallon
 (5) Lehn's "Manufacture of Ink" gives this formula for a red fuchsine ink:

- Fuchsine 2 parts
 Gum arabic 5 parts
 Alcohol 10 parts
 Water 100 parts
 Pour the alcohol, 90 per cent., over the finely rubbed fuchsine and effect complete solution by gently heating. Dissolve the gum arabic by itself in the water, strain the solution, and heat to boiling. Into the boiling solution pour the fuchsine solution in a thin jet, stirring constantly.

Creosote Pills.

(Subscriber). It has been recommended to use pulverized animal charcoal as absorbent, and to mass with turpentine or Canada balsam. For each minim of creosote, a mixture of powdered soap, 1 part, and powdered licorice root, 5 parts, has also been recommended. Martindale gives the following formula:

- Beechwood creosote 2 fl. drams
 Powdered soap 120 grains

Place the creosote in a one-ounce, wide-mouthed bottle, add the soap and mix well. Then digest on a water bath until the ingredients combine. Each two grains of the mass will contain, practically, one minim of creosote, and it is stated that the mass may be combined with other ingredients without decomposition.

J. W. England has used the following formula (Am. Journ. Pharm.):

- Creosote 12 minims
 Powdered licorice root 18 grains
 Powdered soap 1 grain
 Powdered acacia 6 grains

Triturate well the creosote with the licorice root until the latter has absorbed the creosote, and then add the soap and acacia. Make into a mass with an exipient of glycerin and syrupy glucose (1 part by volume of the former to 4 parts by volume of the latter). Divide into 12 pills, and inclose in gelatine capsules. He says that encapsulating in gelatin is essential to mask the creosote odor. Where relatively large quantities of creosote are desired to be given, an excellent method is to admix the creosote with twice its volume of olive oil, and inclose in gelatine capsules.

Still another process was described some time ago in a foreign pharmaceutical journal, the writer claiming that the pills thus prepared kept well, and could be coated by any of the ordinary processes. The pill mass is prepared as follows: Dissolve 2 parts of gelatin in 1 part of water and 8 parts of glycerin, by the aid of heat, and let it stay on the water bath until all the water is driven off, which may be ascertained by weighing the capsule and its contents. To this massa gelatinosa add 30 parts of creosote, while the mass is still warm, and keep the mixture in a tightly closed vessel. When creosote pills are desired, they may be prepared from this mass, every four parts of which contain three parts of creosote, by adding any desired vegetable powder.

The German Unofficial Formulary directs creosote, 10 parts; glycerin, 2 parts; powdered extract of licorice, 10 parts, and powdered licorice root, 18 parts. The ingredients are massed in the usual manner.

Polish for Tan Shoes.

(J. S. C.) A light colored (bright yellow) shoe polish may be made by incorporating in the desired "paste" or "dressing" a sufficient amount of phosphine (chrysianiline or leather yellow); darker polishes may be prepared with Nankin or Bismarck brown, the intermediate shades being produced by mixtures of the lighter and darker dyes. Here are some formulas from the Era Formulary and elsewhere:

- (1) Yellow wax 4 ounces
 Pearl ash ½ ounce
 Yellow soap ¼ ounce
 Water 12 ounces

Scrape the wax small, and boil all the ingredients together until a perfectly uniform cream is obtained; then remove from the fire and add:

- Turpentine 8 ounces
 Phosphine 4 grains

Dissolved in

- Alcohol 12 ounce
 Shake the mixture until thoroughly combined and make up to 24 ounces with water.

- (2) Yellow wax 6 ounces
 Linseed oil 10 ounces
 Spirit turpentine 30 ounces

Dissolve by means of a water bath in a closed vessel and add:

- Curd soap 4 ounces
 Previously dissolved in
 Water 2 pints
 Stir continually until cold. Then color with
 Nankin brown 3 drams
 Alcohol 1½ ounces
 Previously rubbed together until uniform.

- (3) Annatto ½ ounce
 Household soap 1½ ounces
 Yellow wax 6 ounces
 Old cod liver oil 4 ounces
 Oil of turpentine 10 ounces
 Distilled water 24 ounces

Cut the annatto into small pieces, put it into a mortar, and make into a cream with 3 ounces of boiling water. Dissolve the soap in the rest of the water by heating, and have ready in a Winchester, mixed with the annatto.

Melt the wax and cod liver oil together, and add the turpentine gradually without increasing the heat. Add the mixture 4 ounces at a time, to the soap solution, shaking vigorously until all is combined.

Paste.

- (4) Yellow wax, dark..... 1 ounce
 Palm oil..... 1 ounce
 Oil of turpentine..... 3 ounces
 Melt together on a water-bath and color if desired with Nankin brown (5 grains dissolved in a little alcohol).

Labels and the Stamp Tax.

(R. P. C.) asks if the preparations bearing the following labels must bear stamps.

(1) ESSENCE WINTERGREEN.—Dose, adults a teaspoonful in a little sweetened water. For flavoring purposes use to suit the taste. Manufactured by —.

(2) PURE ESSENCE OF PEPPERMINT.—Dose, adults 1 teaspoonful in sweetened water. Children in proportion to age. Manufactured by —.

(3) SPIRITS OF CAMPHOR.—Dose, from five drops to a teaspoonful, first added to sugar and then mixed with water. Manufactured by —.

(4) SWEET SPIRITS OF NITRE.—Dose, adults 1 teaspoonful every 3 or 4 hours in cold water. Children in proportion to age. Put up by —.

(5) PAREGORIC.—Ordinary dose: Two days old, 2 drops; 1 week old, 6 drops; 1 year old, 10 drops; 2 years old, 12 drops, 10 years old, $\frac{1}{2}$ teaspoonful. Adults, one teaspoonful. Manufactured by —.

(6) PURE COLD PRESSED CASTOR OIL.—Dose, adults, 1 tablespoonful. Children in proportion to age. Put up by —.

(7) GOLDEN TINCTURE, (Hoffman's Anodyne). U. S. P.—Useful in nervous irritation and sleeplessness. Dose for adults, one-half to a teaspoonful. Manufactured by —.

(8) TINCTURE ARNICA.—To be used externally. Valuable in the treatment of bruises, sprains, tumors, rheumatic pains, etc. Bathe freely the parts affected several times a day. When the skin is broken dilute with water to suit. Manufactured by —.

(9) PURE QUININE.—1 doz. 2 Gr. capsules. Put up by —.

(10). FINE SWEET OIL.—Put up by —.

(11) ESSENCE CINNAMON.—Prepared from Ceylon cinnamon bark. Manufactured by —.

We believe that Nos. 6, 7 and 8 are all that can be held to be taxable under the present rulings of the Commissioner of Internal Revenue. However, the Collector of Internal Revenue for this district informs us that all of the preparations except Nos. 9, 10 and 11 are taxable. In the face of the final rulings promulgated by the Commissioner of Internal Revenue at Washington last week (see Era, August 4, page 151), we can hardly understand the conclusions upon which this opinion was based. There is no question, however, that "golden tincture, useful in nervous irritation and sleeplessness" and "tincture arnica, valuable in the treatment of bruises, sprains, etc.," should be stamped, because the labels contain statements of recommendation and, therefore, come under the restrictions outlined in the last clause of section 20 of the Act: "The stamp taxes * * * shall apply to all medicinal articles compounded by any formula, published or unpublished, * * * which are advertised on the package or otherwise as remedies or specifics for any ailment, etc." In passing upon this section the Commissioner ruled that it would not be construed "as prohibiting the printing of the formula and the dose on the label, or words indicating the therapeutic action of the medicine in purely technical language not in common use."

With regard to the title "pure cold pressed castor oil," the Commissioner has once ruled that castor oil so labeled must bear the requisite stamp, though this ruling seems to be antagonistic to the spirit of the law and opposed to constructions he has made upon other questions of similar import. In this case the words "pure cold pressed" merely indicate a well known and established method of manufacture and have for their only object the definition of the grade of the castor oil so labeled. It is expected by many that the Commissioner will rescind his former ruling on this point. He certainly should.

Of course it is taken for granted that none of these

preparations is "put up in a style or manner similar to that of patent, trade-mark or proprietary medicines in general." If they are thus put up they must be stamped. It would doubtless be a good plan for you to write to the Commissioner of Internal Revenue at Washington (Hon. N. B. Scott) for specific information, enclosing with your request samples of labels, styles of packages, etc. He will probably reply to you through the collector of Internal Revenue for the district in which you reside. His decision should be authoritative.

Ginger Ale and Sarsaparilla.

(W. S.) Ginger ale may be prepared in the form of a syrup which is to be mixed with carbonated water when served, or it may be mixed in the fountain in the proportion of 1 to $1\frac{1}{2}$ gallons of ginger syrup with enough water nearly to fill a ten-gallon fountain and then charged in the usual way. The ginger ale sold in bottles is made in the latter manner. Here are some formulas for ginger ale syrups:

- | | |
|-------------------------------|---------------|
| (1) Ginger essence..... | 4 fl. ounces |
| Lemon essence..... | 2 fl. ounces |
| Tincture of capsicum..... | 20 drops |
| Solution of citric acid..... | 1 fl. ounce |
| Caramel..... | 30 drops |
| Syrup..... | 1 gallon |
| (2) Ginger essence..... | 2 fl. ounces |
| Tincture capsicum..... | 2 fl. drams |
| Orange flower water..... | 1 fl. ounce |
| Solution citric acid..... | 1 fl. ounce |
| Syrup, enough to make..... | 64 fl. ounces |
| Caramel, sufficient to color. | |

If the ginger essence already contains capsicum, no further addition of the latter will be required. The orange flower water may be replaced by 2 fluidrams of lemon essence. A small amount of vanilla extract may be added (Manual of Beverages).

Ginger Ale.

- | | |
|--------------------------------------|--------------|
| (1) Tincture of ginger, U. S. P..... | 7 fl. ounces |
| Tincture of capsicum..... | 3 fl. ounces |
| Oil of lemon..... | 1 fl. dram |
| Solution citric acid..... | 1 fl. ounce |
| Sugar..... | 10 pounds |
| Water, enough to make..... | 10 gallons |

Mix in the usual manner, and charge not to exceed 150 pounds pressure.

(2) The following extemporaneous method may be employed: Into a suitable bottle, having the capacity of about 12 fluid ounces, put—

- | | |
|--|-------------|
| Syrup ginger..... | 1 fl. ounce |
| Syrup lemon..... | 2 fl. drams |
| Carbonated water, enough to fill the bottle. | |

Cork the latter instantly, and secure the cork with twine or wire.

A sarsaparilla beverage may be prepared in a similar manner, either by using a syrup of sarsaparilla already prepared for the fountain or by adding a sufficient amount of one of the following "essences" to the water in which the sugar has been dissolved and charging the liquid (to the required pressure) in a carbonating apparatus.

Extract of Sarsaparilla for Soda.

- | | |
|------------------------------|---------------|
| (1) Oil wintergreen..... | 4 drams |
| Oil sassafras..... | 4 drams |
| Alcohol..... | 16 fl. ounces |
| (2) Oil wintergreen..... | 16 fl. drams |
| Oil sassafras..... | 2 fl. drams |
| Oil cassia..... | 15 fl. drams |
| Oil cloves..... | 15 fl. drams |
| Oil anise..... | 15 fl. drams |
| Alcohol, enough to make..... | 16 fl. ounces |

ITROL.—The complaint is frequently made that this remedy at times does not produce the desired effect or produces it in an insufficient degree. Dr. Werler regards this to be due to the improper methods of preparing the solutions and recommends to proceed in the following manner: A brown bottle is thoroughly washed, then rinsed with distilled water, and the weighed quantity of absolutely dry, white, and very finely powdered Itrol shaken in it at first with a little cold distilled water, and then boiling distilled water added in small quantities at a time, the mixture being shaken after each addition, until the solution has the desired volume. It should be perfectly clear, without sediment, and must not come in contact with cork or other organic matter. The bottle is preferably glass-stoppered, but cork covered with wax paper will answer. (Ph. Post.)

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XX.

NEW YORK, AUGUST 25, 1898.

No. 8.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York.
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL..... 237	eral Will Not Decide Ex-
CORRESPONDENCE..... 239	press Tax; Wholesaler
Dr. Pierce Replies to the	Advises Repeal of Stamp
Druggists' Protest..... 241	Tax..... 253
ORIGINAL AND SE-	Attitude of the Retail
LECTED.....	Drug Trade: Kentucky
Advertising a Retail Drug	Druggists' Protest to
Store..... 243	Discourage Cutting..... 254
The Retail Druggist..... 244	Jerry City Druggists
Photo Supplies as a Side	Agree on Prices; More
Line in a Drug Store..... 245	Nonsense From the
New Atmospheric Gases..... 246	Druggists' League..... 255
Trade Prospects in China	Big Chemical Combina-
and Japan..... 247	tion Contemplated; N. Y.
Myths and Folk Lore of	Merchants' Association..... 256
Belladonna..... 249	NEW YORK AND VI-
PHARMACY..... 248	CINITY..... 256
QUESTION BOX..... 251	NEWS LETTERS..... 258
NEWS AND TRADE DE-	BUSINESS RECORD..... 264
PARTMENT..... 253	ASSOCIATIONS..... 265
Manufacturers Want Fur-	BOOK REVIEWS..... 268
ther Concessions on Tax	STATE OF TRADE..... 269
Rulings; Attorney-Gen-	MARKET REPORTS..... 270

BACK NUMBERS WANTED.

We will pay 15 cents each for copies, delivered at this office, of The Pharmaceutical Era of

July 8, 1897.

July 15, 1897.

December 30, 1897.

Address, The Pharmaceutical Era,
Box 1483, New York.

CHANGES IN PHARMACY.

The older pharmacists do not need to be educated over again, but they all know that methods, and even facts, in pharmaceutical practice differ to some extent from those of years ago. They are also aware that a review of studies and renewed acquaintance with elementary principles are great helps in keeping their knowledge up to date. The Era Course in Pharmacy offers a most desirable opportunity to pursue a systematic review of pharmacy. The method of conducting the course keeps up attention and interest. The time necessary to be devoted to it can easily be spared by the busiest pharmacist, and the expense is but nominal. The expenditure of \$8 secures the Era, which every pharmacist should have anyway, and also provides for the quizzes and examinations by mail which are features of the Course. Practicing pharmacists who wish to review their early studies under the guidance of competent instructors, and thus better equip themselves professionally, should send for prospectus, giving full details of the Era Course in Pharmacy. Both Junior and Senior classes begin work during the first week in September and lectures for both classes begin in the first issue of the Era in that month.

The Pharmaceutical Era,
Box 1483, New York.

Patenting of Chemical Processes and Products.

We always expect something breezy from Chicago, and Mr. Bodemann is a Chicagoan who never disappoints in this respect. When he has anything to say he says it, and says it in direct, forceful, breezy language. We don't always agree with him, of course, but with what he says on another page of this issue we are heartily in accord. It would be hard to improve upon his straightforward, sledge hammer arguments on the patent and trade mark question, but it may do some good to repeat and emphasize these arguments.

With regard to the granting of patents on medicinal articles, the United States has certainly placed itself in an objectionable, inconsistent and anomalous position. It is perfectly proper to grant patent protection to a process, this is only fair reward for the inventor and discoverer, but when it comes to a patent on the product, the thing itself, the principle, it is at once illogical, unjust and constitutes an embargo against progress in investigation and invention. It is directly opposed to the basic principle, the foundation, of the patent laws. This practice of the Government has created and fostered abuses which have become unbearable, which ought not to exist, and which could, we believe, be abolished if the druggists and doctors of this country were to get together in united protest and concerted legislative action. Who will be the Moses to lead us out of the wilderness?

There is no objection to the Government giving all the patents it sees fit on processes for making an article, but the thing itself should be open to manufacture by any other process or manner not infringing on the patented methods. We have no right to make phenazolid (for instance) by the patented process, but we should have (though we haven't) the right to make it by any other process we are able. With regard to patents on chemicals, the Government has followed a course diametrically opposite to that it pursues when a machine or an industrial product is in question. The principle of the telegraph is open to all, only this or that particular appliance for making use of the principle is patentable. Any one can use the suction principle in coating pills, but he cannot, of course, employ Jones's particular machine for the application of this principle. We can, if we choose, make a product similar to or identical with celluloid or vaseline by any process we choose, provided we do not infringe upon the patented process or the copyrighted name, if such exists. Why are not such rulings applied to chemicals?

We believe that by a strong fight, carrying the question to the higher courts, the patents on these products would be held invalid. This was shown in the case of subgallate of bismuth. This was patented as a product, the method of making it was patented, and the trade mark dermatol was granted. But a good stiff fight by a Philadelphia house resulted in victory for its contention. We don't want to make phenazolid by Smith's process, we don't even wish to call it phenazolid, but we do ask the right to

make this and all similar products by other processes and call them by other names. In all justice and logic, why shouldn't we have this right?

Mr. Bodemann is rather disgusted with the American Pharmaceutical Association because of its little accomplishment in this matter. True, the A. Ph. A. has done nothing of consequence as yet, but then great bodies move slowly, and it may yet get at it with vigor and carry it to a successful issue. There are good, well posted men on the association's committee who know what is needed, and who as a committee and as individuals have done yeoman service. Just as soon as they can awaken the association as a whole to a sense of its responsibilities, we may hope for something better than the simple "whereases" against which Mr. Bodemann inveighs. Perhaps something tangible will be accomplished at the Baltimore meeting.

A National Business Organization for Retail Druggists.

If the stamp tax act has done nothing else of good, it has at least roused the retail druggists of the United States to a realization of the fact that if they want to effectively protect their commercial interests they must get together, organize and then work and fight for themselves. From all over the country have come and are coming walls of protest against the extortionate price advance made by certain manufacturers of proprietary medicines under cover of the opportunity afforded by the imposition of the war tax upon these articles. There are protests and remonstrances and threats, in a confused jumble, but standing out clear is the sentiment that now is the time for the formation of a national body to look after and advance the business interests of the retail drug trade, and to have no other purpose whatsoever. It is recognized that had there been in existence such an organization, the retailers would not to-day be paying, as they are, all the tax (in many cases much more), but that it would rest where it belongs and was intended, upon the manufacturer.

Several local or State associations have advocated the formation of such a national organization, and have resolved vigorously to this effect, but only one, so far as we know, has taken definite steps to bring about the desired result. That one is the Chicago Retail Druggists' Association, an account of whose action was fully related in this paper last week. To carry out its project, that body passed the following resolutions, which it will bring to the notice and action of other associations, and for which it desires further prominence by their publication in the pharmaceutical journals. The resolutions read:

WHEREAS, The recent advance of prices by many manufacturers of proprietary and patented preparations is but one more instance of the advantage taken of the retail drug trade by reason of its present inability to act through a united and centralized influence for the protection of its commercial interests; and

WHEREAS, The action taken by many State and local retail druggists' organizations in every section of the country is unanimously favorable to united action in protesting against this latest imposition on the retailers; and

WHEREAS, The members of the Chicago Retail Druggists' Association are united in urging that some step may be taken to secure relief from this and other wrongs suffered by the retail druggists, the Executive Board of the said association, called in special session to consider means of relief, after a thorough canvass of the conditions of the retail drug trade at the present time, adopts the following resolutions:

RESOLVED, That in accordance with the expressed sentiment of the retail druggists of Chicago, the Chicago Retail Druggists' Association appoint a special committee of fifteen to prepare and issue an invitation to the State and local retail druggists'

associations of the United States, requesting their co-operation in holding a delegate convention in St. Louis, October 17, 1898, at the same time as the annual meeting of the National Wholesale Druggists' Association and of the meeting of the Proprietary Association of America, to the end that the protest of the retail drug trade against the action of the manufacturers in shifting the burden of the stamp tax upon the shoulders of the retailers may be made effective; and, further:

RESOLVED, That being firmly convinced the present is a particularly auspicious time for the establishment of a permanent national organization of retail druggists which shall promote the commercial interests of its members, we recommend to the said committee the inauguration of a movement and the formulation of plans for the creation of such a national body at the proposed meeting in St. Louis.

This meeting at the same time and place as the alleged foes is certainly carrying the war into Africa. What the result will be remains to be seen. The proposition to form such an organization of retailers, however, has our hearty commendation. Nothing is more needed, and the good it may accomplish is incalculable. The commercial section of the A. Ph. A. never filled the bill. The A. Ph. A. has had too many irons in the fire, and some of them have been allowed to get cold, as was unavoidable. It will have all it can attend to in looking after the "professional." But a word of caution is offered. If the national commercial organization be formed, let it be upon broad and wise lines. The lamentable fiasco of the retailers' so-called national organization of a few years ago was directly attributable to narrowness of sentiment and little petty jealousies and spite which were displayed in its discussions and acts. The individual must be ready to sacrifice his identity and his little individual interests for the good of the whole, if the movement is to be the sound and broad success so confidently hoped.

Cost Mark for 'Copy' Prescriptions.

It has been a question with druggists how to adjust the charge on a prescription which has been previously filled one or several times by other druggists, who, however, give no indication of the price they charged. The druggist who compounds such a "copy" or "refill" is equally anxious to avoid overcharge or undercharge. Either is undesirable, for many reasons. There is some objection to marking the price upon the prescription in plain figures. Whether it be feasible to overcome the difficulty by the adoption of a secret mark, to be known to and followed by all druggists, is the problem. We have little faith in such a solution, as the lack of unity and organization among druggists is very general and notorious; still any suggestion in this direction is commendable. L. P. Holzhauer, of Newport, Ky., thinks he has arrived at a way out of the woods, and we take pleasure in printing his views, as follows:

I have often had the unpleasantness of filling a prescription from some brother druggist of some other city, who has given the patient a copy (as have all druggists), and each time it would be a sort of bite-your-teeth task after it was filled to tell the customer the price. Either you filled it 5 or 10 cents less, or charged 5 or 10 cents more, and in either case it gives the patient room for a think. This should certainly be avoided, as the copy prescriptions are on the increase. I gave a copy yesterday to a patient going to Mansfield, Ohio, and this same thing came to me again. If I could only mark the price so my brother druggists could know the price. I studied along a little, and came to the following decision. All pharmacists read the item as it is carried from one journal to another, and it would not be long until all brother druggists would know how much to charge.

Use the word "Pharmacist" spelled this way:

p-h-a-r-m-a-c-i-s-t.
1-2-3-4-5-6-7-8-9-0.

So when you give a copy and you filled it for 40 cents, mark it thus:

"T., for transient, always capital.

"r. t., for 40 cents, making the mark "T-r. t."

For this prescription I charged 40 cents and gave a copy. By so doing, each druggist would know exactly what to charge.

Some may criticize this by saying some druggists might be benefited by charging 5 cents less for it. I think differently, as the patient looks at it in one of two ways, either he got robbed the first time, or the druggist who filled the copy didn't put in all the medicine. If you charge 5 cents more, the patient takes the situation vice-versa.

Glad to Hear it.

The authorities of Wisconsin who are charged with the enforcement of the food law are getting to work in earnest, and it is time they should. They have prosecuted and secured convictions in several cases where the adulteration of food products was carried to the extreme of rapaciousness and criminality. What do you say of a manufacturer who will label "pure" an extract of lemon containing less than one per cent. of oil of lemon, only 20 per cent. of alcohol and colored with naphthol yellow? It is pleasing to record that the manufacturer of such stuff is the one prosecuted, not the ignorant grocer who retails it. Many cases are being brought to light where the lash is to be applied vigorously. The proprietor of a department store was caught in the drag net and had to take his punishment.

We call attention to this Wisconsin campaign, not to commend the officials (they ought to have been at it long ago), but to suggest to the authorities in other States that they, too, have a similar duty, and the work lies close to hand.

Artificial Albumen.

As is natural, there is very much interest evinced by chemists and scientists generally in the widely circulated announcement that Dr. Lilienfeld, a European chemist, has succeeded in producing albumen synthetically. It is claimed that at the demonstration of his method given by the discoverer, the artificial product showed all the reactions and percentages of composition of the natural peptone as formed in the stomach and intestines. The details of his discovery and method are as yet unknown to us, save in general outline, and are awaited with interest. Further researches are necessary, and are under way to establish whether the artificial albumen has the same food value and the same effect on the body as natural albumen. If it be proven that the discovery is genuine and the albumen equally valuable with the natural product, Dr. Lilienfeld has won a large niche in the temple of fame.

Why Dr. Pierce Raised Prices.

On another page of this issue is printed the reply of the World's Dispensary Medical Association to the protest of retail druggists against the advance in prices made by many manufacturers of proprietary medicines by reason of the stamp tax. Dr. Pierce's reasons and arguments will be read with interest by the trade generally.

The Purdue University Agricultural Experiment Station is out with a bulletin advocating the feeding of skim milk to growing chickens. This proposition is rather novel to us, and suggests the possible desirability of its extension to the employment of wet nurses for the chicks or bringing them up on the bottle. But why "skim" milk? Why not give 'em a good article?

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

MORE PRIZE WINNERS.

Telford, Tenn., August 18, 1898.

To the Pharmaceutical Era:

I was very much gratified over my success as a prize winner in the Era Course in Pharmacy, and beg to thank you most sincerely for your kind letter of the 4th inst., and for the very valuable book which you have so kindly presented to me as a prize for the eleventh highest grade attained in all subjects in the recent examinations. Let me assure you that I highly appreciate this compliment, and shall always value and keep this prize in kind remembrance of you and the Era Course. I must say that I feel very much stimulated over my success—so much so that I can enter the Senior Course with renewed and strengthened courage, hoping to attain a still higher rank in the good work. Again thanking you for the above mentioned compliments, and with best wishes for the future success of the Era Course, I remain, with kindest regards,

Sincerely yours,

FRANK S. BROWN.

Conajoharie, N. Y., August 19, 1898.

To the Pharmaceutical Era:

In my return from a vacation I find the Era Course twelfth prize, a U. S. Pharmacopoeia, awaiting me, for which you have my sincere thanks. It is a very useful prize and one which I shall appreciate. I have derived much benefit from a study of the Era Course last year, and hope that the Senior year will prove as beneficial, or more so, than the Junior year.

You have my heartiest wish for a successful year in both the Junior and Senior branches.

Very respectfully,

A. EARLL HODGE.

Foxcroft, Maine, August 19, 1898.

To the Pharmaceutical Era:

On returning from my vacation I was greatly surprised upon learning that I had won the seventh prize, of Remington's Pharmacy. I am much pleased with the book, and thank you for it. May the students of the coming year be as enthused in the work as we have been in the past.

Yours sincerely,

KILBY P. SARGENT, JR.

THE LEHN & FINK HERBARIUM PRIZE.

Atlanta, Ga., August 13, 1898.

To the Pharmaceutical Era:

The prize from Lehn & Fink has been duly received and allow me to offer you my sincere thanks for this useful Herbarium. I appreciate the prize on account of having won it over so many students and consequently value it. Your Course has certainly benefited me considerably, especially in Botany and Chemistry.

ALBERT GREENBERG.

THE MONSTROSITIES OF THE PATENT LAW.

Chicago, August 15, 1898.

To the Editor:—

My last letter to you was not exactly intended for publication. Had I so intended it I would have applied the finishing touches of the brush and scissors to bring the effort up to the grade of literary merit, as is becoming the student of Shakespeare, Bacon, Addison, Ben Cotton, Billy Rice, and other authorities. As it is, you make me say "that other countries do not grant patents on chemicals and in the healing art." It should read "chemicals used in the healing art." And while I am at it, correcting that letter, I would like to add this: In the present antitoxin case, it makes little difference to me whether Behring is the original inventor, or the gentleman from Japan. What incenses me, and has incensed me for ten years, is the fact that the United States

is the only country that grants patents on medicines, and patents that catch the coon a-coming and a-going. The United States patent covers the name, the process of manufacture and the finished product.

Germany grants patents on medicines, too, but only on the process, and in this way there were about six different inventors in Germany who held patents on sulphonal. The German patent laws do not cover the finished product, and these six German inventors came to this country, pooled their issues, and got a United States patent on all the six patents. Then they had us, and the lessee could just as well have asked \$5 for an ounce as \$1, for no other sulphonal could be made, sold or swallowed here.

It may interest you, and for all I know you may be aware of, how they do things in Germany.

Of about one hundred patents applied for, ten are granted. Of about ten granted, one is kept alive by the annual payment of fees to the office, for each patent to be kept alive has to pay a heavy fee to the Patent Office, a fee that is raised every year of the life of the patent, so that three years were the one hundred applications down to one patent alive.

We are apt to boast of our way of running things, and claim that ours is the best of governments under the sun. But with all that, we can learn a thing or two of some of the effete monarchies, and what interests us pharmacists most is this horrible misfit system of patents on medicines. France does not grant patents on any medicine, nor admit a so-called patent medicine through its custom houses. Would to God we could imitate that!

There is some confusion even among pharmacists about patent medicines. The well known old fashioned patent medicine is called patent because there is no patent about it. Patent medicines are only trade marked and copyrighted nostrums, be they compound mixtures of liquid, or any synthetic preparation mixed with bicarbonate of soda—cost price 5 cents, selling price \$1 per ounce. They are patent medicines, the composition of which is filed at Washington, and not known to the consumer or prescriber. It is a shame and disgrace to our profession that physicians can be so devoid of honor and dignity as to prescribe mixtures of which they know absolutely nothing, except that the non-pharmaceutical manufacturer claims that the mixtures alleviate pain, reduce the swelling and remove rat spots. But I've switched off my track. Every pharmacist ought to make it his business to look into this monstrosity of our patent laws, and then go to his member of Congress and demand a change of these laws.

The A. Ph. A. has been asked time and again to do this much, but the A. Ph. A. is more interested in cutting out a pattern for a model college curriculum—for which nobody cares—and is so largely under the influence of jobbers, manufacturers and their hirelings that there is neither profit nor place for a pharmacist in the ranks of the A. Ph. A. Were our A. Ph. A. a body of energetic pharmacists, we could change any patent law we wanted changed, and elect any Congressman to stay at home we wanted to. Chicago pharmacists have unseated real mayors and nightmares, just by pulling together and delegating their authority to a body of ten active, energetic pharmacists who knew what to do and did it. It seems impossible to get life into this Rip Van Winkle Institution, and I for one would move that we get up an organization of national character of active pharmacists—Retail, Registered and Regular—the "3 R's," and, excluding all teachers, drummers, jobbers, manufacturers and walking delegates. I move that you, Mr. Editor, put this question up for discussion among your readers, either by embodying these views in one of your able editorials, or, if need be, by giving this letter for publication. Sincerely yours,

W. BODEMANN.

A SPANISH FLAG FOR HOOD, TOO.

Iowa City, Iowa, August 18, 1898.

To the Editor:

In my note in the Era of August 4th, I stated "Hood Pays the Tax." I have found by my last invoice that his prices are the same as Ayer's and I say put the Spanish flag on him.

Yours respectfully,

M. W. DAVIS.

ANOTHER PROTEST AGAINST PRICE ADVANCE.

Caneyville, Ky., August 17, 1898.

To the Editor:

It is with pleasure I note your stand for the retail druggists in the fight against those manufacturers who have taken advantage of the Government war tax to increase their prices so much beyond the price of stamps, instead of bearing the burden of taxation themselves, thus throwing the loss on the retailer or consumer. The law was not intended to operate against the retailer, but the tax was intended to be borne by the manufacturers; but those same manufacturers have taken advantage of the law to increase their already exorbitant prices to such an extent that the profits of the retailer have been reduced to almost starvation. I am in hearty accord with the letter of Messrs. Harrison & McDaniel, of Columbus, Tex., which appeared in your issue of the 11th inst. I think the retailer should boycott all manufacturers who have raised their prices because of the tax. I would urge all retailers to refuse to push all such goods and in their stead sell those whose prices have not been advanced.

We note that many patriotic (?) firms have sent out circulars to the drug trade notifying them that owing to the increase in price of goods entering into the manufacture of their products, they must advance their prices. At the same time, many of those firms were in business when the stamp act of the last war was repealed. They did not lower their prices then. Why should they raise them now? If under the old tax they could make them at a profit, why not now? Many firms making blood remedies, etc., just as good have not raised prices and one has lowered from \$8 to \$6, and many others announce that they will pay the tax themselves. We note with pleasure that the manufacturers in the South and West have almost unanimously agreed to pay the tax themselves, and they should be encouraged by pushing their products; while in the North and East, where we would naturally look for the greatest patriotism, the manufacturers have shown their love for the Government and the people by not only refusing to pay the tax themselves, but have advanced prices in some cases 3 or 4 times the cost of the stamps. Will we, as retailers, stand this robbery? No, we can't afford to, and I would say to all retailers that "We don't have to keep in stock any medicine," no matter how much it is advertised, and by a little tact we can make ourselves and our trade felt among the manufacturers who advance prices. Let every druggist but work to his own interest and push those goods that pay a profit, and it will not be long till, instead of being looked down upon by those "Robber Barons," we will be looked up to by them, and concessions will be made that will allow us to handle their goods at a profit.

W. B. MONTGOMERY.

NOT A DILATORY BOARD.

Baltimore, August 18, 1898.

To the Editor:

In the issue of August 15th of "Merck's Report," under the head of Maryland's Dilatory Board, there appears an unjust criticism of the present Board of Pharmacy of our State. As I am the only member of the preceding board that was continued, I would be pleased to have you state in your valuable paper that although through being ill, as also having illness in his family, the present secretary was not as active during the first six or seven weeks as he might have been, as well as being new in the office, he is now performing his duties as faithfully and conscientiously as anyone can.

Furthermore, the present board, though but three months in office, has gone to work promptly and is looking after all violations of the law brought to its attention, having thus far been instrumental in closing an improperly conducted store, as also causing a fraudulent registration to be discontinued.

In conclusion it may be said the present board is not moving with a brass band nor an advance agent, nor will it employ such methods, but it will do its work quietly, promptly and effectually.

Sincerely,

LOUIS SCHULZE,
Pres. Board of Pharmacy.

DR. PIERCE REPLIES TO DRUGGISTS' PROTEST.

World's Dispensary, Buffalo, N. Y., Aug. 20, 1898.
A. Timberlake, Esq., Secretary Indiana Pharmaceutical Association, Indianapolis, Ind.:

Dear Sir—We have your two circulars dated Aug. 12, 1898, containing copies of the resolutions adopted by your association at a special session held on Aug. 10.

The first of these resolutions, addressed to "Manufacturers of proprietary Remedies—furnishing their remedies to so-called cut-rate druggists and department stores," is as follows:

"Resolved: That we request such manufacturers of medicine—to furnish their products to the trade only through recognized wholesale druggists."

To this we reply that it has been the steadfast policy and practice of this house to protect the legitimate retailer in every way possible. We have never sold to cut-rate druggists or to department stores. That they obtain our medicines is due to practices and methods as entirely beyond our cognizance as they are beyond our control.

We have spent many thousands of dollars, and much painstaking labor in earnest endeavors to keep our preparations out of the hands of aggressive, advertising cutters, and we exceedingly regret to be obliged to, acknowledge that, while our efforts have sometimes met with some measure of success in certain localities, yet in others the proscribed cutters manage, by hook or by crook, in roundabout and devious ways, to obtain our remedies in spite of all our earnest efforts to have their sale confined to legitimate channels only.

In view of the general tenor of your circular, we can only hope that the attitude of the retail trade may not compel us to depart from a policy to which we have so faithfully and steadfastly adhered in the interest of the retailers for so many years.

The preamble to the second resolution charges the manufacturers with being "unjust and unpatriotic." In that they have increased the prices of their medicines to cover the war tax, and resolves,

"That we, the Indiana Pharmaceutical Association, in special session assembled, do urgently appeal to these manufacturers to reconsider their action in advancing prices, and ask them to cheerfully assume the patriotic duty of paying the stamp tax, as it was evidently intended by Congress that they should do, and not place it upon the retailer, who is now carrying more than his share of the burden."

The assumption of this resolution, that Congress intended the tax on proprietary medicines to fall on the manufacturer, has arrayed against it the precedent and practice not of our nation alone, but of the leading nations of the world. The charge of lack of patriotism is as uncalled for as it is unwarranted by the actual facts. Why should Congress single out one tax in especial and make its operation unique and distinct from that of every other similar tax ever levied or collected?

It is the intent in the collection of the present war tax, as it is in all similar taxes, that the consumer should pay the tax, thus distributing a burden fairly and equitably among the public at large. That this is the intent of the law is obvious.

(A) In the very principle which governs taxation, it is the intent that taxes shall not be levied on the actual necessities of daily life, but upon those articles which are extra to the common, every day need. No tax on bread would be thought of for an instant, because the baker does not pay the tax but the buyer, and the tax would be a hardship on millions. A tax on salt too would fall heaviest on the poor to whom it is an essential commodity and would not therefore be considered, by the modern political economist. In all taxation it is kept in view as a fundamental principle that the consumer pays the tax, and the proof of this is that the articles selected for taxation are chosen in accordance with that principle.

(B) That it is the intent that the consumer should pay the tax is manifest in the general operation of the revenue law.

There is a tax on telegrams. Who pays it? The man who buys the right to use the wire of the Telegraph Company—the consumer. The same is true of the Express Companies. They charge the tax to the public at large. When the added tax was placed on tobacco, the price of cigars and cigarettes at once went up. The retailer paid more, but he charged the extra cost at once to the consumer who paid more for his cigar and so paid the tax.

(C) That we are acting within the intent and purpose of the law is evident, by the interpretation

given to similar laws in this country, in England, and other countries.

It has been well held that Taxes should always fall on the consumer, on the broad principle that every one is a consumer and only a few are producers, and so the tax becomes a tax on the whole nation and not a tax upon any special class of persons. In all cases where the tax is one of long standing and permanence, it is necessarily reckoned as among the fixed charges of any firm doing business in the merchandise so taxed, and the amount of the tax is added to the price of the goods as a part of the original cost.

But were it otherwise, the adding of the amount of the tax on proprietary medicines to the selling price would be a necessity from a purely commercial view point. The selling price of our wares is based on the cost of the product, the expense of manufacture, the cost of the conduct of business, the amount of risk and the large expense of publishing and popularizing these remedies in order to create a sale on which the retailer shares the profits without sharing the risk or cost of the advertising. Any firm going into any kind of business which involved the payment of the stamp tax would figure that tax as part of the cost of its goods, and base its price to the trade accordingly. It would be a necessity to do this. The man who, in making his price, left out an element of cost would soon be out of business.

But if this is a necessity to a man just starting in business, is it not equally necessary to a man established in business? As a matter of fact, it is and must be so, and the advance of our prices was not an arbitrary transaction prompted by greed, but was, in fact, a real, commercial necessity.

A tax amounting to very nearly 6 per cent. on our gross sales could not be ignored. In fact, it is more than our net profits have amounted to in some years, figured on the gross business transacted. We have stated in a recent circular to the retail trade that we had contemplated an advance in the prices of our goods before the war tax was proposed or anticipated. The price of our \$1 preparations had for years been \$7.75 per dozen. We had decided that it would be necessary to advance the price to \$8 per dozen. The tax came, and we advanced our price to \$8.25 per dozen. In years past, when competition was far less, when it cost much less than it does to-day to keep up an active demand for our medicines upon the retail druggist through liberal expenditures in advertising, when substitution, which is so extensively practiced to-day, was scarcely thought of, the former price of \$7.75 paid us a far greater net profit than we are now able to realize out of our advanced price of \$8.25. This is due to the unfavorable trade conditions prevailing, and for which we do not feel that we should be held responsible. The retail druggist is not the only one whose former profits have had to give way to the new trade conditions. Manufacturers are sufferers as well, as we have already pointed out.

If the new conditions have come to stay, as many believe, then it seems to us that both manufacturers and dealers must adapt themselves to the new order of things, submit gracefully to some reduction in their former profits, and try and bear their misfortunes with becoming equanimity.

Even at our advanced price of \$8.25 per dozen, supposing the freight should cost the retailer on an average 25 cents a dozen, making the total cost to him \$8.50 per dozen, in sections where our \$1 preparations sell at the full price, the dealer still makes a net profit of a little better than 40 per cent. This, while not fully up to what we would be pleased to see druggists realizing on our products, will, nevertheless, compare favorably with the profits enjoyed by merchants in other lines of trade. We must not lose sight of the fact that while there is a larger volume of business being transacted to-day in this country than ever before, yet it is being handled on much smaller margins of profit than in former years. Both manufacturers and dealers in every line of trade have to submit to reductions of profits formerly enjoyed. In sections where cutting prevails dealers generally have been able to advance the selling price on our goods by as much as, or more, than the actual advance in cost to them; and it is a curious fact that the dealers in those sections where cutting prevails are not the ones who complain of our moderate advance in the price of our goods. It comes chiefly from those who are and have been able to com-

mand the full retail prices established by the manufacturer. While we have always opposed cutting of prices by every means and feasible plan in our power to exercise or carry out, it would seem an anomalous condition if we should suffer in the esteem of those who have always been able to get full dollar prices for our dollar preparations, while our action is not condemned or criticized by those who have not for years been able to realize full prices on our and other preparations.

It must be patent to all that every successful proprietary medicine manufacturer in fixing his prices is obliged to take into account the sharper competition of to-day as compared with the past, the greater cost per bottle of marketing his products, owing to increased cost of advertising, and the disposition on the part of some dealers to substitute other articles for his, after he has induced the customer to call upon the druggist for his products.

We have been charged with evading the war tax, but we pay that tax, as consumers, on every telegram we send, on every check we draw, on every express package we send out, on every taxable article we purchase. We pay this general tax in common with all. Why should we be singled out for a special tax disproportioned in every way to our profits and opposed to the very principle of taxation?

When we say "disproportionate to our profits" we are aware that our statement is liable to be called into question. Exaggerated ideas seem to be quite generally entertained as to the profits enjoyed by the manufacturers of proprietary medicines.

There is no business which demands a greater risk of capital in such large sums than the manufacturing and marketing of proprietary medicines. Sums of hundreds of thousands of dollars have been put out to establish a medicine and make a market for it, and when half a million dollars had been spent the tide was only turning. In other and numerous cases it never did turn, and tortures have been sunk in fruitless advertising.

The great mistake lies in this: That the popular eye is focused on the few shining examples of success, where courage, thrift, forethought and good judgment, coupled with an article or articles of superior merit, have at last won a stable commercial footing.

How many such firms are there? You can count them easily. Count then the years that they have been engaged in business, against the fact that the average life of a proprietary medicine is but two years, and you may begin to gain some idea of the wrecks that have gone down in that sea of risk, carrying with them more gold than Spain's galleons carried in the days when she freighted fleets with the precious metals.

We believe our friends, the retailers, have been misled in large part by the artful cries of designing persons, who swell up with patriotism because they think there is an extra dollar in it for them.

The patriot for revenue only is not a novelty. It is a fine thing to see a manufacturer whose price was always \$8, against our price of \$7.75, strike an attitude and say "Behold a patriot! I don't put my price up! Buy my goods, which are just as good as any, and are pure red, white and blue patriotic articles!" Patriotism of that kind has corrupted courts, sold out armies and ruined nations. It is a patriotism eternally associated with the names of Judas and Benedict Arnold. Having prostituted the national flag to his base purpose of forcing his nasty, Sloppy, Syphilitic Syrup down the throats of the American people, the proprietor of that article would do well to seek the seclusion of the forest and spend the remainder of his days with that other self-acclaimed patriot in digging his "Swamp Root."

It is an interesting fact that the few proprietors who have not found it necessary to advance prices, and who are so frantically waving the American flag to attract attention to their disinterested patriotism, are those the sale of whose preparations, as is well known to the trade, had, either from lack of intrinsic merit in the articles themselves, or for the want of enterprise and push on the part of the proprietors, or possibly a little of both, pretty well run down. The hope of reviving their fast waning fortunes and prestige by a grand flourish of flags, and posing as patriots, will scarcely deceive anybody. Possibly a few impressionable dealers may be misled thereby and be induced to get down a few old, dusty, fly-specked,

shop-worn packages of their goods, long since charged up to profit and loss as dead stock, and endeavor to "push" it off to some unwary customer—and thus may self-acclaimed patriotism have its reward.

It must not be overlooked either that these anti-war prices of our little band of self-sacrificing patriots were higher than ours are after the advance. Had we been accustomed to receive \$8.50, \$8.75 or \$9 per dozen for our dollar preparations, we, too, could well have afforded to let well enough alone, but, unfortunately, we were not in that position.

In conclusion, we desire to say that, while we are not able to grant the concession in the prices of our goods that is asked, for reasons already stated, we at the same time most sincerely regret the discord which has come to mar our many years of close and pleasant relations with the retail druggists of this country.

We have stood by them so long and so steadfastly, through fair and through foul, sparing neither time nor money in their behalf, that it touches us somewhat closely to be made a party to charges which seem to us both ungenerous and unjust.

We can but hope that a calmer view of the questions at issue, together with a recollection of some of our efforts in the past in the retailers' behalf, may restore the friendly feelings which we have always sought to deserve, and the loss of which we should so sincerely regret. Very respectfully yours,

WORLD'S DISPENSARY MEDICAL ASSOCIATION,
R. V. Pierce, President.

THE CHEMIST'S SOLOQUY.

To send, or not to send; that is the question:
Whether 'tis better for the old man and me
To let the physic of a careless doctor
Go to the patient, or ask the medic
For a new prescription. To send; to err
Perhaps; and by that error run the risk
Of making worse a fellow-man who lies
Helpless in his bed—a responsibility
Devoutly to be shun'd. To send; to err:
To err! perchance to kill; ay, there's the rub.
For should the error kill what harm may come.
What sheriff's man, with writ, may chuck us hence,
Must give us pause; in this respect
The druggist's life is laden down with care;
For who would bear the blame of
Defending an action for damages?
Of plining in a danky dungeon cell;
Of reading headlines in the daily press:
"Another Chemist's Fatal Error!"
When he could substitute a thing of chalk.
Or ask the doctor? Who would sit in doubt
And wonder what on earth the end might be
But that the dread of stirring up the doctor's ire—
And turning him into a mortal foe—
With all his family, puzzles the will
And makes us rather run a right big risk
Than poke up strife that we would not have?
Thus policy does make cowards of us all,
And thus our natural love of proper action
Is sickled over with the pale cast of thought
And things which 'twere better had our care
And even leave to take their own sweet course
And kill or cure as chances.

Chem. and Drug.

A correspondent calls our attention to an advertisement in his local paper, which, speaking of a certain well advertised (but cut-rate) toilet soap, says:

"The war tax is $\frac{1}{4}$ cent on each cake, or $\frac{1}{4}$ cents a dozen. The manufacturers say it's a good time to advance the price. To cover the $\frac{1}{4}$ cents a dozen, they have advanced it 42 cents a dozen. Quality considered, it was high enough before. There are other soaps just as good, where the makers do not take this opportunity to charge the public six times the price of the war tax and say it is to cover the tax. What do you think? We have ———, if you want it.

Is there not an indication in this of the way retailers generally will treat proprietary articles whose manufacturers have made similar unjust price advances? There's a question of policy involved which every shrewd business man will be wise to consider. The above extract, by the way, is from the advertisement of a department store.

EURESOL, or resorcin mono-acetate, is recommended, dissolved in acetone, as a remedy for skin diseases.

ADVERTISING A RETAIL DRUG STORE.*

BY B. SCHROUDER, GRAND RAPIDS, MICH.

In Michigan we have 1,563 retail drug stores—we have 3,115 registered pharmacists and 323 assistant registered pharmacists. Deducting from this the number of registered pharmacists who are employed in the various laboratories and wholesale drug stores in our State, and from the remainder trying to strike an average, I would presume to say that the number of registered pharmacists to each drug store would be less than 16-10 per cent. From these notes I believe that most proprietors are the men who "run the store" themselves and naturally attend to the advertising of their respective stores. The only reason any pharmacist advertises his store in any way is to increase his trade, not to increase the business of his competitors nor to increase his own trade and clerk hire without making enough money out of the system to cover the additional expense. Advertising is always an expense. The word "advertising" can be fitted to your method of doing business just as well as, and in some cases more properly than, by spending money on dodgers, sending almanacs, samples of pills and headache powders from house to house.

The old sign you sometimes see in stores where they don't spend a cent advertising any other way which reads

"A PLEASSED CUSTOMER IS OUR BEST ADVERTISER"

means very much, but, often enough, the man who runs the store wherein this sign hangs don't half realize this important fact. He is the same person sometimes who loses the sale and oftentimes the customer by neglecting to offer to get the desired article (which he happens to be out of) and promptly sending it to the customer's house, or if the prospective customer should happen to remark (unconsciously, of course), "You are dearer here than they are at Jones' drug store," he will at once proceed to get huffy and say, "Well, you had better go to Jones' and get it."

That, I think, is bad business. He loses his sale and hurts his customer's feelings, and usually finds that the would-be buyer takes his advice at what it is worth and purchases the desired article at Jones'. Later, though at heart repenting his hasty words, the disappointed salesman endeavors to reconcile himself by repeating the history of the incident to his fellow friends or competitors, who smile with him, but don't say much.

Then, if we take a look at the fronts which the leading stores of our largest cities put up you will notice that they are very inviting—windows are clean, well lighted, signs are plain and there are not too many of them; the vestibules of the front doors are dustless; I have known druggists to have their sidewalks and woodwork in the entrance to their stores swept and dusted morning, noon and night. The druggist in the small town or the neighborhood druggist in a city does not need to have a large stock or be too poor to have the index (front) look inviting. Sticky fly paper half full of dead flies is no good as an advertisement; neither does a tin plate filled with poison fly paper look inviting. I have found that I had just as much trouble with flies in my windows with the fly paper in them as I do now without. One thing is certain, it will take a long while to kill off all the flies—perhaps they will never all die—so it is not just as well to keep the window floors covered with dark cloth and dress them with such goods that are not affected by fly spots, or doesn't it pay to change the trim often enough and make more delicate displays?

A dollar a week judiciously spent in window dressing is not extravagance for even the smallest drug store, if the proprietor does really care to keep his store front tidy and inviting. New and valuable trade is lurking in every locality. There is transient trade in every town or neighborhood. Don't let yourself think that it is only on the main streets in the large places where transient business is found. My store is a neighborhood store. I sell drugs, soda, cigars, stationery and school supplies. I would also handle bicycles and hay rakes and still insist that my store was a drug store and advertise it as such if I had the room and necessary capital. I have been in the busi-

ness for myself but a few years and have not by any means an ideal drug store, nor even an ideal store, but as it is now I often shake hands with myself when I visit the store of a grunter.

When I visit a strange store I can tell before I talk with the proprietor that he is a grunter (if he is one); his clerks are not quick in getting to the front; he himself is apt to remain in the rear of the store at his desk—his cigar case has empty boxes in it—(I never allow my customers to see the bottom of a cigar box in my show case; when down to the last layer is taken out I replace by a full box.) The shelf bottles in the store of a grunter are like his store front—dusty, his soda fountain isn't half dressed—this kind of druggists is not uncommon, they do not observe enough of the world of business to keep them out of the rut, they don't attend a druggists' convention often enough, they don't visit other more prosperous stores often enough. Any retail druggist who will take the time for just a couple of weeks' vacation every year, recreate himself, meet other druggists from his town and other towns, and take in a ball game occasionally, will find he is much better pleased with himself and the condition of his trade—he will be able to return to his store and see it as other people see it, and then he will make up his mind he is going to do business.

My most successful method of advertising has been through the newspapers, not very large ads, but in first-class positions. I don't write ads about my store that I don't believe, and usually my ads are so simple—yet pertinent—that people who read them know what I am talking about, and if the goods advertised interest them, they investigate further by coming into the store. I do not believe in writing advertisements showing an attempt to be funny, or to quote poetry. The ad should be made to "stick out"; this can be done usually by the proper use of borders and bold headlines. I don't believe it is always wise to push only the goods on which you make the most money. It is best to be firmly convinced that your substitute is really as good as—or better than—the article the customer asks for—if you are not positive about it, do not mention it, sell the goods with a narrow profit and the customer will not be liable to give you the "go by" next time.

Although for advertising medicines—church concert programs and pamphlets issued by local societies are practically worthless, I often allow myself to be "held up" just for the sake of putting in evidence of good will and sociability. If the enterprise is conducted by fakirs who make a business of it, I promptly tell them that their scheme doesn't interest me and turn them down. Every man in business has to use his own judgment in selecting places where it is worth while to be a "good fellow," but there is no need of any pharmacist being an "easy mark."

House to house distribution of attractive advertising matter is splendid advertising, even though many merchants in the same city do it. Advertising of this kind is invariably given some attention by members of the household, but don't hire boys to attend to it, pay a fair price and have it done well—don't allow your pamphlet or sample to be laid on the doorstep, the bell rung and then leave it; if you must ring the bell wait there until some one comes and hand that someone the advertising matter, then your advertising is given what you expected—attention—and if it is well printed and written in an instructive manner, it will make the desired impression.

Cigars in the show case should be properly marked, every box should have its price card on it, for even the most popular and staple brands are not known by some smokers. My cards are all white ones, about the size of a visiting card and plainly printed with a pen—it's the black and white system—and pays. The candy case is fixed the same way—and no goods go into my show windows without the price plainly exposed—it shows no fear of competition, even if the price of competitors happens to range a little lower.

LANOLIN-POWDER may be prepared by dissolving lanolin in ether, chloroform, acetone or alcohol, mixing the solution with a basic powder, as magnesium carbonate, zinc oxide, bismuth subnitrate, or talc, and drying the mixture by spreading out on flat dishes. The dried mass is reduced to powder (Drugg. Ztg.)

* Read at the 1898 meeting of the Michigan State Pharmaceutical Association.

THE RETAIL DRUGGIST.*

His Position Scientifically and Commercially a Quarter of a Century Ago and His Condition To-day.

BY HENRY A. FABRA.

Without much ado or a great display of oratory, I shall endeavor to establish the fact that pharmacy as a profession—as a distinctive calling—is fast losing its identity. And we ourselves, who are or claim to be pharmacists, must shoulder the responsibility. Once we were pharmacists, skilled in the art of preparing medicines. A thorough knowledge of botany, chemistry and materia medica was an accomplishment which distinguished us from the rest of mankind. To-day we are simply druggists! We buy and sell drugs—ready-made prescriptions and proprietaries!

By these assertions I do not mean to imply that we are any less honorable or competent from a commercial standpoint; but I do assert that the retail drug store of to-day is as foreign to the legitimate pharmacy of twenty-five years ago—considered not only from a financial standpoint, but likewise as relates to our standing in a scientific light—as is the modern electric car to the ancient horse car. The transformation in the one case deplorable; in the other, a most welcome improvement.

We are drifting—drifting toward an end where we will be made to realize that jealousy, strife and indigestion beget embarrassments, disappointments and finally ruin! In order to make my argument clear, I ask your attention to a little historical data bearing directly on the subject.

The first medical act in England was passed in 1511, entitled "An act for the appointing of physicians and surgeons." It vested the faculty of medicine in one body of men, who practiced medicine, surgery and pharmacy. The physicians' assistants were styled apothecaries. These gradually acquiring information respecting the properties of drugs, plants, etc., began to transact business on their own account. In its earliest advent in this country, pharmacy and the practice of medicine were likewise commonly combined in one and the same person.

Since we inherited our medical institutions from the mother country, the confusion of interests which prevailed there was handed down to us, and in the absence of any laws to the contrary there continued friction upon friction, resulting in an open rupture, along about the middle of the present century, between a class of graduates in medicine who were unsuccessful in a purely medical or surgical practice and the apothecary or pharmacist proper. The unsuccessful physicians presumed to enter the field as dispensers and dealers in drugs and medicines. The pharmacists remonstrated, and characterized the physician-druggist as an interloper; the physician, on the other hand, holding that by virtue of the ancient coupling of the two callings in one he had carte blanche to pursue any branch he desired. Hence, the rupture grew to such an extent that the old truism, "two wrongs never make a right," was entirely discounted, and in its stead was adopted the ancient Hebrew motto, "an eye for an eye and a tooth for a tooth." Many pharmacists attempted to retaliate by surreptitiously antagonizing the physician, counter-prescribing, etc., making therein the fatal error which opened the way for an industry which is rapidly converting us all into ordinary merchants—mere vendors of ready-made pharmaceuticals, proprietaries and sundries.

The manufacturing pharmacist, a separate and distinct industry made possible by the jealousies above referred to, and the lack of good sound judgment on the part of the pharmacist at the crucial period, have almost entirely obliterated the scientific distinction once enjoyed by us—that proficiency which, attained by constant practice in the art of preparing and compounding medicines, where our chemistry, our botany and our materia medica were in constant use, made us pharmacists and gave us a right to the title.

Some of our number may prefer not to acknowledge it, but the fact remains just the same that we were as

much in error as some of our unfortunate friends of the medical profession.

The manufacturing pharmacist, now firmly established, comes into our field, samples our physicians with his numerous specialties, pulls the wool over their eyes as it were with seductive testimonials, therapeutic notes, etc., and laudates his wares as superior from the fact that they are prepared in quantity; that the retail pharmacist or druggist hasn't the appliances or the experience to produce such products as he offers—a reflection upon our calling which for some reason or other we can not or will not see! Having successfully interested the physician, the retail druggist must stock the particular line of elixirs, tablets or pills with which the physician has been sampled, and which, as a matter of course, he will for a time prescribe. We have no other alternative! We dare not assume even to suggest that we have a national formulary, the prescriptions and formulæ in which would supply combinations the physician might employ with decidedly more credit to himself, more satisfaction to his patient, and afford a more reasonable revenue to his druggist. Our hands are tied with a fetter of our own making!

Then enters the second and possibly more formidable foe, considered from a financial point of view—viz, the patent medicine man. In this industry we have forced upon us a most undesirable tenant—one who not only fails to pay us even a reasonable rental for shelf-room, but is so wholly unmindful of the fact that we "laborer, the servant, is worthy of his hire," he in many instances almost compels us to handle his wares for glory! The smooth, oily tongued salesman comes in, lays his hand on our shoulders, whispers a confidential discount or possibly an extra dozen, with attractive advertising, etc. We bite; we swallow bait, hook and all! We give our name, our reputation for truth and veracity, to advertise "any old" patent medicine. What do we get in return? The same smooth salesman goes straightway to the department store, the general store in the country, or even the peddler, and literally "rips us up the back."

Now, gentlemen, these, as you must all admit, are no fairy tales, but a plain statement of facts—a condition which does exist throughout this entire land. We have looked for a remedy—we have formulated plan after plan—but until we learn to fully comprehend the meaning, the import, of the motto of our own State of Kentucky that "United we stand; divided we fall." Individuals may continue to rack their brains how best to overcome this or that obstacle until the end of time, and yet all their plans will fall as water upon a duck's back, and "there will come a time some day" when the druggist will find it necessary to seek another and still another side line. The honorable distinction first referred to in this paper will receive another and still another blow; pharmacy and the skilled pharmacist will have been relegated to an innocuous desuetude. Hence it follows that if we would arrest the downward course we are traveling, we will recognize in this turbulent period "the tide in our affairs which taken at the flood" will carry us back to the high standard which once was ours and which should distinguish us again.

We will blot out petty jealousies, obliterate the imaginary lines which in many localities are so pronounced, and as one united body of intelligent men we will demonstrate that there is a latent force within us which, though dormant for a time, has now been thoroughly awakened and must be recognized.

"In union there is strength." "But a house divided within itself cannot stand"—two aphorisms which at this moment are most potently illustrated; and what is true of a nation is equally true of a State, a community, or a society of men! Hence, I again implore you, awaken from your lethargy; accept the injunction that what is good for our neighbor is good for us. What is good for us as individuals must be good for the business or the profession collectively. Let us go to work as one man and meet the issues with vigor and determination. If the proprietary medicine men are using us for their own benefit—if they are presuming that a credulous public will have their nostrums at any price—if they calculate that the druggists, having once let the bars down, giving them free entrance to our harvest field, will do so again and again—

* A paper read at the twenty-first annual meeting of the Kentucky State Pharmaceutical Association. (Reprinted from the Stein-Vogeler Drug Review.)

then this is the hour and this the place where we can recover that which by our own folly, our own indiscretion, has been gradually slipping away from us!

If we have standing in a community as individuals, we certainly can also command confidence. We can prepare our own specialties—we can utilize our art of preparing and compounding medicines—we can push and advertise our own products, each man in his own sphere and yet all to the same purpose—without the aid or intervention of a middleman, and without any division of profits! We can recover the friendship of our natural ally,* the physician, by disseminating a vest pocket epitome of the National Formulary—making up samples of such formulas as will interest the particular physicians whose patronage we expect to obtain, and sample them for a time as liberally and as systematically as does the energetic agent of the manufacturing pharmacist. Let them understand by practical results that we are not only druggists, but that we are pharmacists. Our interests are identical, and I dare say seven out of every ten physicians are our friends, and they will come to us—they will co-operate with us if we will only meet them half way.

In conclusion: As previously pointed out, we have time and again antagonized our own interests—we have attempted retaliatory measures—we have feigned justification for our overt acts by pointing to the apparent infringement of our calling by certain ones of the medical profession. In short, we are brought face to face with the fact that we can never accomplish a right by returning wrong for wrong! So let us come down a few pegs, buckle on our armor, and with a long pull, a strong pull, and a pull all together, success will finally crown our efforts.

PHOTO SUPPLIES AS A SIDELINE IN A DRUG STORE.*

BY E. E. CALKINS, ANN ARBOR, MICH.

Every druggist has had more or less call for the chemicals which are used by amateur photographers. Undoubtedly many druggists have done as I did—first bought chemicals for my own use and then gradually worked into the supply business. In fact, there is no doubt that there are druggists here that could give me pointers on this subject, if so I shall be glad to hear from them. I have found that it can be worked very profitably as a sideline, for several reasons. In the first place the druggist can make many of the developers and toning solutions, and thus save a profit that would otherwise go to the manufacturers. Again, cameras and apparatus, together with the sample photographs that every dealer should have, are very good materials for a window display, making the store more attractive as well as selling the goods themselves. A druggist generally has better windows for display than his neighbor the photographer, who often attempts to handle these supplies, and he can supply the chemicals more satisfactorily than opticians or department stores because of available weights and measures.

The requirements may be briefly summed up as follows:

An investment of from \$100 to \$500.

A dark room for developing and for changing plates and films.

A little ability as a salesman—the more the better.

A disposition to help amateurs out of their difficulties and, lastly,

An ability to help them by reason of actual knowledge and experience.

The money invested can easily be turned two or three times a year, so that to do a business of \$1,000 about \$300 is required as a capital. This may be increased at the beginning of the season and decreased toward the end of the year. Of course the largest sale comes during the summer months, but, unlike bicycles, there are many cameras sold for Christmas and all through the winter months. Supplies, too, are in demand during the winter. Snow pictures, flashlight pictures and interior work in general call for supplies, and many amateurs print during

the winter from the negatives that they make in the summer.

Like every other business, there are some leakages to be avoided, such as unsalable cameras, cameras that are too cheap and are consequently constantly coming back on the dealer's hands for repairs, carrying too many kinds and too large quantities of sensitive paper so that it spoils before it is sold, and sensitive films which are dated and cannot be sold after they reach a certain age. These of course can be avoided in a great measure by careful buying.

In buying a stock there are two persons whose advice is, as a rule, to be avoided—the professional photographer and the man who has taken pictures for years with the same old camera and thinks that no one ought to use anything that he has not used in years gone by and that snap-shot cameras are of no use at all. The general public do not see through the eyes of either one of these. They want the newest up-to-date camera on the market and as a rule the one that is advertised. It is not necessary to sell all makes of cameras, plates, etc., any more than it is necessary for a cycle dealer to handle all makes of cycles. It is well to have a representative stock, i. e., to have a camera of each type, but it is not necessary to have more than one make, for instance, of plate cameras, 4 x 5 size to sell at \$5.00.

Small sizes, under 5 x 7, and small prices, under \$15, are in most demand and there is less cutting on these than on the higher priced ones. You can sell ten cameras at less than \$10 as often as you can sell one at \$25, and the ten users of low-priced cameras will use ten times as many dollars' worth of supplies.

In film cameras and films it is safe to tie to the Eastman Kodak Co. I was at Niagara Falls a short time ago, where cameras are thicker than bicycles. There were many more of Eastman kodaks to be seen than of all other makes combined. This company have a sufficient variety of film cameras to suit almost everybody, and every camera can be depended upon to make a reasonably good picture. Very little repairing is required by reason of shutters, etc., getting out of order. They are the only line of film cameras on the market on which the price is not cut. The Eastman Co. maintain their list prices by requiring every retailer to sign a contract to maintain them, and they refuse future shipments in case a dealer does not live up to his agreement. This is an objection for proprietors in other lines.

In plate cameras we are not so fortunate, because all the best advertised plate cameras are cut, and in most cases it is not at all difficult for a purchaser to get discounts direct from the manufacturers themselves. The Sun-Art Photo. Co. have started out bravely on the Eastman plan, but their list price is about the same as that of other manufacturers, and it is difficult for a retailer to get list prices for their goods when equally good cameras can be had at a discount.

Magazine cameras have never been popular. In spite of serious attempts on the part of several manufacturers at different times to make them go. One reason is that a dozen or more plates in a camera make it heavy to carry around compared with films, and another is that they are complicated and apt to get out of order. The price, too, has usually been prohibitive. But folding plate cameras in 4 x 5 and 5 x 7 sizes, will probably always be salable, as will also box cameras in sizes 4 x 5, 3½ x 3½, and 3¼ x 3¼, all to use plate holders.

It is very easy of course to have cameras left on your hands at the end of the season, and while they are more staple than cycles, there is very frequently some improvement that makes them more unsalable the next year. Cameras, paper, and some plates are bought to best advantage from the manufacturers on account of better discounts. It is better to buy of the larger jobbers than of the smaller ones for the same reason. It is well to keep some standard brand of plates at list prices unless so near to the city that it is necessary to compete with cut prices on all brands. I find that I can get full list price for Seed plates and make a good profit on Stanley plates by selling them at a discount because of the greater wholesale discount and it still gives me a reputation for selling plates cheap.

I have said nothing about supplies for galleries. It requires more capital to handle plates by the case and

* Read at the 1898 meeting of the Michigan State Pharmaceutical Association.

other things in proportion, and it brings you into competition with the small jobber who often cuts the prices pretty low. For my part I have been satisfied to take what gallery trade came to me and let it go at that.

I have never found it profitable to sell cameras on the installment plan. As a rule, if a person cannot pay in full for his camera when he gets it, he will be unable to make his payments and pay for the supplies that he will use besides.

When Eastman's Solio paper was reduced in price it looked as if my receipts from that source would be reduced, but I began to push the cabinet size in gross packages at 75 cents and the result was that we sold more paper than before and more toning solution with it.

I think that it will pay to push Velox paper, because it can be worked in the evening and requires much less time than ordinary printing out papers. People who have been in the habit of having their printing done can find time to do it themselves with this paper.

Cramer's plates are not adapted for amateur work. They are good, but too difficult.

Take it all in all, photo supplies make a very nice side line for any druggist who will give it the attention that it deserves, but there is not enough of it to make it profitable for every druggist to carry a stock. If one man in a town of ten thousand or less is doing a good business, don't try to get it away from him. There is not enough for two. Push some other line instead. But whatever you push—push hard.

THE NEW ATMOSPHERIC GASES.

The newly discovered gases of the atmosphere have already been mentioned in these columns. Literary Digest translates from *La Nature* (Paris, July 9) a brief account, by M. Henri de Parville, of the discovery of the whole group, together with some notes on their probable relation to the other constituents of the air and the possibility that still other elements may yet be discovered in it. That so many gaseous substances should have existed in the air we breathe, unknown to the most skilled chemists since the dawn of their science, is certainly wonderful, and the discovery and isolation of these substances—three of them within the last few months—constitute one of the most interesting chapters in the history of scientific investigation. Says M. de Parville:

"This atmospheric air of ours is positively a boxful of surprises! Since Lavoisier's time we have believed that the air is a mixture of two gases, oxygen and nitrogen; approximately 21 parts oxygen and 79 parts nitrogen. To this was added a little carbonic acid, some water-vapor, a little ozone, and a little nitrate of ammonia after a thunder-storm. Such was the classic composition of the atmosphere. So we were quite stupefied when in 1897 Lord Rayleigh demonstrated that an important element had been overlooked—argon. Argon was the cause of a great deal of discussion, but its existence was acknowledged to be certain. Since then we have said that the air is composed of oxygen, nitrogen, and argon.

"Scarcely four years have elapsed, and we are already forced to modify our recently acquired knowledge. Messrs. Ramsay and Travers have just discovered a new constituent of the air. And they have sent a specimen of it to M. Berthelot. This gas having gone unperceived up to our own epoch, M. Ramsay has baptised it with the significant name of 'krypton' (hidden). M. Berthelot has proposed a more harmonious name, 'ecton' (from 'æon' or 'æther'), because of the characteristic spectrum rays of this gas is found also in the spectrum of the aurora borealis. How did Messrs. Ramsay and Travers get hold of this new gas?

It is well known that air is now liquefied easily under a pressure of 180 atmospheres and at a temperature of -101° . Mr. Ramsay devoted much of his time last winter to the slow distillation of liquid air. Because of the different boiling points of the liquids entering into the composition of the liquefied air, the most volatile liquids, such as the nitrogen, are gotten rid of, and the oxygen is disposed of by absorption; thus the argon remains. The English scientists thus prepared a bottleful of liquid argon. And by further evaporation and chemical treatment they finally obtained at the bottom of the vial a residual liquid. What was this liquid, which was not argon, although it contained traces of it? This volatile liquid gave in the spectroscopic very beautiful bright lines corresponding to no known gas, one of them being the beautiful green line of the aurora borealis. So krypton was discovered. This gas has a density of 2.44, that of oxygen being 16. It is heavier than argon, less volatile than nitrogen, than oxygen, and than argon.

"At the session of June 29, of the Academy of Sciences, Mr. Ramsay announced the discovery of two other gases in the air. By continuing the distillation of argon, after the isolation of krypton, he found first another gas differing from the others in the characteristic lines of its

spectrum. He named it 'Neon' (new). There remained still another substance, a solid, which was volatilized at a higher temperature. This second gas resembled argon, but had superb spectral lines. And when the electric current is passed through it, it shines with incomparable splendor. It has been named 'metargon,' to signify its relationship with argon. Thus, in less than a month the air has been enriched with at least three gases unknown before the month of June, 1898. And at last accounts the atmosphere had become the following mixture: oxygen, nitrogen, argon, krypton, neon, metargon. Is the list closed?

"Perhaps not; but perhaps, on the contrary, it is already too long. For who knows whether some foreign substance may not have found its way into the liquid air and, volatilizing, have given rise to deceitful spectroscopic lines? This is but a hypothesis, but we must take it into account until it has been disproved.

"In any case we must be astounded to find that the atmosphere contains traces of gases that have long escaped the investigations of chemists. Their isolation has depended on new methods. Is not the atmosphere the residuum of all the gases that since the beginning have been unable to combine with the solids of the terrestrial crust?

"The composition of the atmosphere has constantly varied during the geological ages. At the beginning it included all the gases and the vapors of solid substances that condensed as the cooling of the globe went on. The sun's atmosphere offers us on a large scale a picture of what probably is the composition of the primitive sphere. Afterward, condensation taking place and chemical combination assisting, the atmosphere became purer; little by little the gases and vapors entered into solid compounds that form the earth's crust, and nothing remained above this crust but water-vapor and gases that were either left over from the compound or were unable to combine. The carbonic acid, once so abundant, has disappeared, by combination with calcium substances, forming carbonate of lime; the remainder has become dissolved in water, and only very small quantities remain in the air. The excess of oxygen remains in the atmosphere with the nitrogen. But it is clear that by close search we still ought to be able to discover traces of gases that do not easily combine with the materials of the crust, such, for example, as argon, so called because it does not enter easily into combination with any known substance. After argon, we might assume that there would still exist in the great residue of the ancient atmosphere traces of hitherto unknown gases in a free state. And the facts have demonstrated that this is the case. Perhaps the list of new gases is not yet completed, but evidently we shall find only traces of such. We ought to be pretty near the end. In any case, these new discoveries have a great speculative interest and bear witness yet another time to the accuracy and power of the methods of investigation of modern chemistry."

RULES FOR DOSAGE.—Groff divides drugs commonly used into three classes; those given in doses of from $\frac{1}{4}$ gr. to 2 gr., including aconite-root, cochineal, cantharides, digitalis, opium, physostigma, and strophanthus. The second class includes those given in doses of from 1 gr. to 3 gr., and the third class all those given in other doses, i. e., from 5 to 30 gr. It is noted also that poisonous liquors have a strength of 1 per cent., and fluid extracts, with one exception, a strength of 100 per cent. Tinctures are placed in classes from 0.4 per cent. (paregoric), 2 per cent. (nuxvomica), 5 per cent., 10 per cent., 15 per cent., 35 per cent., 45 per cent. If it be remembered that the percentage-strength of a solution means that the number of grains indicated by the percentage is contained in every 100 minims of the preparation, it will be known that one minim contains 1-100 part of that quantity, and it can be readily calculated from this how much drug is in solution in any number of minims. For instance, if one wishes to give 5 grains of belladonna, and to use the tincture, the quantity of the tincture is determined by remembering that it is a 15 per cent. preparation. Therefore, as there are 15 grains in every 100 minims, or about 1-6 gr. in one minim, to make 5 gr. will require 30 minims of the drug.

POLYFORMIN.—Two preparations of this name have been made, a soluble and an insoluble form. The insoluble is prepared by dissolving resorcin in aqueous formaldehyde and, without cooling, adding an excess of ammonia. The product contains a high per cent. of formaldehyde and is a powerful bactericide. It is an odorless, yellowish-brown, amorphous powder, insoluble in all known solvents. Soluble polyformin has the composition of di-resorcin-hexamethylene tetramine and occurs in colorless crystals, which are decomposed by heating in solution. It is soluble in water and alcohol and is used externally for skin diseases, internally as diuretic and antiferment. (Ap. Z g.)

(Special Correspondence of the Era.)

TRADE PROSPECTS IN CHINA AND JAPAN.

Tokoyo, Japan, June 1, 1898.

En route here we stopped a couple of weeks in North China, making Shanghai headquarters. That city was a surprise, for though we had expected to see a town of some size and vigor, we were not prepared to see so much life. We did not anticipate seeing so many factories, huge cotton and silk mills, sending the smoke skyward from their tall chimneys. It is the manufacturing city of the East, and each year adds to the output of its looms.

The people of Shanghai, one and all, speak of their town in something the same way the inhabitants of Chicago laud their berg. They claim it is the only town of the East, and the only one with a future, and when one takes into consideration what has been accomplished in the past ten years, there is strong reason to agree with them.

It certainly is in the most favored portion of China, and though located a short distance from the ocean proper, is on a river that all steamers can navigate, and what is more, this same river extends hundreds of miles inland, and fleets of steamers, small and large, ply to the various villages and cities on its banks. With this Yang-tse-Kiang Valley, which is noted for its fertility and dense population, immediately back of Shanghai, there is no reason to disbelieve in the future of the place. It has millions to feed and clothe, and from these same millions can be drawn the cheap labor that is necessary to man the factories present and prospective.

Shanghai is a very cosmopolitan city, and, being a concession port, you find nearly all the great powers represented. To each has been allotted a section of land, so you may go from the American concession, through those belonging to England, France, Germany and Japan, to the Chinese city in a very few minutes, and during this journey you can, if so inclined, deposit a letter in a post office in each concession, and each will bear the stamp of that respective government. It is certainly unique to find one city possessing six different post offices.

The drug business in Shanghai is very good, better in a retail sense than Hong Kong, but I think the last named leads in the wholesale at present. As a matter of fact, the large houses in Hong Kong have branches in Shanghai. The native stores are much better, and I was surprised to see what an extensive line of tablets, etc., one of them manufactured. The manager had his drug training in the United States, and has adopted many of the ideas prevalent there. American products are well known and are becoming more popular each year; this is specially true regarding patent medicines, and all the popular lines are represented.

If any of our exporters or manufacturers expect to build up a profitable trade in China or elsewhere in the East, it is a positive necessity to have a representative on the ground all the time. Success depends upon attention to the many petty details, and we cannot expect our agents or wholesale houses, with their multiplicity of lines, to do this. They have not the time, and should they have, they or their employes have not had the drilling that a specialty man, who has spent years at his work, should possess.

Seven days after leaving Shanghai, and after a pleasant sail through the inland sea of Japan, Yokohama was reached, which was to be our head quarters while in this empire. Since we are out here for business and not as globe trotters, we will treat the business aspect as relating to drugs. There is no country that claims to be a power that has such peculiar laws regarding pharmacy as Japan, and the first step a traveler must do is not to secure a customer, as in other places, but to ascertain whether the government will allow his products to be imported. Being interested in the patent, or as they term them, prepared medicine, we will illustrate this as we found it. If you only want the limited European trade at the treaty ports, there is no trouble, but it is the interior trade, the 42,000,000 of Japanese, that one wants to cater to. Suppose you desire to interest in your products one of the large native wholesale houses. You must make formal application to the

local government, giving the exact formula, proportions, directions for use, and so forth. This application is accompanied by samples of the medicines, and it will be analyzed by the government chemists.

In their reply, you will see just where you are. If they find it to be an ordinary patent medicine, with no injurious ingredients, no opium or forms of same, it may be sold by native dealers, who will be obliged to affix a stamp, value 10 per cent. of the selling price. If they find any of the named objectionable matters, it is classed as dangerous compounds, must be marked so, and only sold by orders of a medical man.

There is another class, known as foods, that bear no stamp, and can be sold by dealers in any line. It is needless to say that these strictures and the many annoyances that dealers, retail and wholesale, are subjected to by inspectors and officials will soon disgust them, and cause them to refuse to handle *this* or that product. The misplacing of this revenue stamp, as seen through the eyes of some officious policeman, will cause a fine to be imposed. And when it comes to having patent medicines prescribed generally by medical men, that certainly will precede the Millennium only a short time.

All of this is serious enough, but when it comes to the manufacturer having to give up his formula to Tom, Dick and Harry, and being for all time after at the mercy of imitators, for which Japan is most noted, the prospects are not so very flattering. Now, we have the right to register trade marks, but continual trouble arises with the imitators. Any Japanese can to-day register the trade mark of any foreign concern, and if the rightful owner take legal steps, he can in course of time have an injunction issued against the guilty parties, but even though you do stop them, you have no right to register your own trade mark to protect yourself, as the government claim you have forfeited this right by not acting in the first instance. All of this is very pleasant for one who desires to build up a business connection.

The drug business in Japan is very large. Drug stores are found everywhere, and I imagine that there are as many, according to the population, as in the United States. I think I am safe in stating there are more wholesale drug stores than in all the rest of Asia combined.

They manufacture a large line of patents, which embraces remedies for all manner of disease. The Japanese woman cuts quite a figure in the retail stores, and you see very few without one or more acting as salesladies. They are, however, generally members of the family. So far as foreign remedies are concerned, outside of treaty ports, I only know of one that has any great sale, and that one is Scott's Emulsion, and its sale can be attributed to some hocus-pocus, or ruling on the part of the Japanese government, that said this excellent compound is only a "food product." So they have no legal restrictions, and these goods can be sold by any one and bear no stamp. But they have troubles of their own, for their product is imitated by many of the drug pirates. I should fancy that there were as many imitations of "Florida water" as the year has days, and some are very clever. Soaps and perfumes are imposed upon in a shameful manner.

The great bulk of drugs imported into Japan pass through the hands of The China and Japan Trading Company. Mr. T. Brower, manager of the drug department, is perhaps the best authority in Japan as to the many peculiar laws that govern the sale of drugs and patents. It does not take him many minutes to say whether or not you can do business in the Japanese Empire, and though his decision may act as cold water on your commercial aspirations, still his genial spirit counteracts in a manner the effect of this information.

Every one asks, "How do you like Japan?"

It is certainly a very attractive country. Its rugged mountains, beautiful valleys, with the closest and cleanest of cultivation, running streams with natural and artificial waterfalls, make it attractive to the eye. But for one to thoroughly enthuse, one must see Japan after crossing the Pacific; must have had from fourteen to twenty days of nothing but the broad expanse of the Pacific to gaze upon; then this country would appear as beautiful as some depict. To the traveler who has seen wonderful India, seen the luxuriant vegetation of

Ceylon, seen the variety of scenery that Java possesses, to his eyes Japan is only pretty. To read the many books written recently on Japan, from Sir Edwin Arnold down to the last globe trotters, one would suppose this was the Paradise. It may be, so far as the general features of the country are concerned, but the discord to a perfect harmony is the people. The children are sweet, nice looking kids; the women are passably good looking, and clad in their many colored kimonos, are bearable, but the men, as a mass, are the most contemptible and insignificant looking lot of humanity I have ever seen. And with this, there is an air of conceit that makes them nearly unbearable. Some writers dwell on the politeness of the nation, and certainly they do bow and scrape considerable, but there is so much of this that it has the air of being insincere, and one soon becomes surfeited with such attentions.

The Japan of to-day and of ten years ago are as different as day from night. Everything has gone forward. The price of everything has advanced, in some instances over 200 per cent. The "ricksha" charges are twice what they were; servants' wages ditto. Even the hotels have doubled their rates, so that to-day, instead of being a cheap country to visit, it is very expensive. The worst luck that ever happened to Japan was her victory over China a few years ago. Before that time she was a peaceful little empire, was free from debt and lived happily in a natural manner. But now all has changed. Her sudden victory has given her an awful case of swell head. She has the nerve to aspire to be one of the great powers, and has, despite the enormous indemnity secured from China, rolled up an immense national debt. She has had such a sudden growth that her clothes don't fit, and they have no statesman tailor who can adjust them.

Her civilization is only a very thin veneer, and she has jumped from the primary stage of government to that of the senior without any intermediate grades. And even if in this desolation of bad management and misgovernment, a Moses did appear, he would be swamped by public opinion.

As a nation, as well as individually, they hate all foreigners. They at heart know they are, as a race, our inferiors, and their laws and actions bear this assertion out. They even are instructing the rising generation that they must consider themselves as good as foreigners, thus making each one mentally conscious that he is not, simply by the assertion. All their laws, general and local, are formed to give the foreigner no foothold. The only use they have for us is to steal ideas and inventions. They employ us for a short time in the various trades, and when they think they have mastered this or that, the foreigner is discharged.

It has been my good fortune to be able to attend two large exhibits of domestic productions, and I took the pains to go through them in a careful manner. The more I see of their productions, the more I am impressed with the idea that any great competition on their part, in the struggle for trade in outside countries, is not to be greatly feared. There is no originality among them, and their copies are, as a rule, most awfully crude. Even though they are cheap, they cannot have extended sale. The inventive genius is comparatively an unknown quantity, and their facilities for stealing ideas and designs are well illustrated, not only in mechanics, but also in the arts.

The bed rock from which all great businesses are built up is here lacking. I refer to commercial honor. European houses that have been here for years, say that this is a rare article; that as a rule they trust no one, for if it be to the profit financially of a Japanese, he has no compunction, whatever. In breaking any contract he may have made, whether it be by word of mouth or written.

Japan has recently made a new treaty with the great powers, and this will soon go into effect, and when it does, the position of the foreigners will be more precarious. It will give them the right to trade in the interior, but they will be immediately under the laws of the Japanese. As it is now, they are restricted to the treaty ports, and are there governed by the laws of their respective governments through the Consuls.

The E. A. T. Society has during the past two years seen considerable of Asia, and with our experiences

gained by personal investigation, have no fear in asserting that it is in China that we can expect the greatest demand for American products.

In the United States the Chinaman is not considered at all in a favorable light, but in China, though he may try to get the best of you when making a contract, when the bargain is made, he will live up to it if it breaks him. With such honorable dealers, and with nearly 400,000,000 to cater to, with a clear body of water between the United States and China, there is no reason why we will not control that trade. While Japan is far more intelligent, still, owing to the laws that govern her, she is not to be compared in any way to the prospects that loom up from China.

We will be glad to leave Japan, and I think the most beautiful view to our eyes, will be Yokohama disappearing in the distance, as our steamer sails toward the Golden Gate, the beautiful entrance to God's country.

WILL A. PEAIRS.

MYTHS AND FOLK LORE OF BELLADONNA.*

The berry of the Deadly Nightshade is known as the Devil's Berry, which reminds us that the whole plant has something uncanny attached to it. It is sometimes called Death's Herb, and was formerly known under the name Dwale, the fruit being called Dwaleberry—i. e., torpor or trance berry—from the Danish word (dwale) meaning a trance or dead sleep. This is the explanation given by some writers, though it is only fair to say that others connect it with the French word *denil*, meaning grief or mourning, because it made those people mourn whose friends ate the berries and died. But the testimony of the Danish *dwale-bær* or trance berry is in favor of the former suggestion. In Chaucer's time it was employed for sleeping draughts, hence his remark that "there needeth him no dwale."

In Bohemia the Belladonna is esteemed as the favorite plant of the devil, who is supposed to watch over it. He may, however, be drawn from it on a certain night in the year by letting loose a black hen, after which it is supposed he will immediately run. The name Belladonna refers to an ancient belief that the Nightshade is the form of a fatal enchantress. The Greek goddess Hekate was supposed to preside over the lower world; she was said to know the names of all the herbs and to teach her daughters their special qualities. In consequence of this such poisonous plants as Belladonna, Aconite and a variety of others were sacred to Hekate.

"I ha' been plucking (plants among)

Hemlock, Henbane, Adder's Tongue,

Nightshade, Moonwort, Leppard's bane."

—Ben Jonson, page 531.

All of which are magic plants.

The Nightshade is said to be a favorite of the devil. Its name, Belladonna, meaning fair lady, refers to an ancient belief that the Nightshade is the form of a fatal enchantress or witch, called Atropa, while the common name Belladonna also refers to the custom of continental ladies employing it as a cosmetic, or for the purpose of making their eyes sparkle.—Notes on Belladonna, from Flower and Flower Lore, by Rev. Hilderic Friend, F. L. S. Belladonna means literally fair lady, and was most likely given to this plant on account of the tempting appearance of these berries. Atropa refers to its deadly properties, coming from Atropos, the ancient name of one of the fates or evil destinies. The Saxons called the plant Ranewort, or Murdering Weed. Raging and Furious Nightshade are also old names, significant of its evil character. It was likewise called Dwale.

The poisonous nature of this plant has been long known; thus, we read that the Scotch, under Macbeth, having defeated the army of the Danes, under Sweyn, destroyed many of them by mixing its juice with ale, wine and bread. Earlier yet it is recorded by Plutarch that the soldiers of Marc Antony were drawn by hunger to eat unknown herbs, and the camp became filled with unhappy, restless men, who, one by one, died of the poison of the Belladonna. In more modern times it is recorded that 150 soldiers were poisoned by this plant near Dresden.—Wild Flowers, and Where to Gather Them.

* These notes were furnished to the Red Cross Notes by Dr. Adolph W. Miller, of Philadelphia, Pa.

PHARMACY.

SAPOLENTUM HYDRARGYRI is a soft, super-fatted potash soap, which is absorbed easily and quickly by the skin. Before application the skin must be moistened with water and the hand dipped into water before rubbing. (Ph. Post.)

EUNOL is a new preparation, which occurs in two modifications, "alpha" and "beta." eunol. It is prepared from naphthols and eucalyptols and is intended for surgical purposes and the treatment of skin diseases. Very bitter, insoluble in water, readily soluble in ether, alcohol, chloroform and olive oil. (Ph. Post.)

EUROBIN is chrysarobin tri-acetate, which is recommended in light, chronic skin affections. It is usually combined with eugallol in a solution of acetone or chloroform, when the effects of pyrogallol and chrysarobin are desired; or with saligallol, when the effect of chrysarobin is chiefly wanted. (Ap. Ztg.)

TREATMENT OF SWOLLEN TONSILS.—It is recommended in *Wt. Md. Pr.* to paint the tonsils mornings and evenings with the following mixture: Iodine 1 grain, potassium iodide 2 grains, tincture of opium 20 minims, glycerin 4 fl. ozs. Half a teaspoonful of the mixture, in a glass of water, is also to be used as a gargle. (Ph. Post.)

LENIGALLOL, or pyrogallol tri-acetate, is a white powder completely insoluble in water. It is a non-toxic combination, has a mild action, and is nearly indifferent towards healthy skin. The sphere of action of lenigallol is confined to the treatment of acute and subacute eczemas and similar affections. The skin is irritated only on long continued use. (Ap. Ztg.)

PERU COGNAC.—A preparation closely resembling the proprietary preparation of this name, may be made, according to *Ph. Centr.* as follows: The prescribed quantity of balsam Peru is triturated with sufficient washed and dried sand to form a mass that is not too compact. This is macerated during one week with the necessary quantity of cognac and the mixture then filtered. (Ph. Post.)

SUGARINE is a compound having 500 times greater sweetening power than sugar. Its composition is methylbenzol-sulphinide, and it is prepared in the following manner: Totuol-cyan-sulphamide is boiled with water and sufficient caustic potash to effect saponification. The solution is cooled and sulphuric acid added to precipitate the new compound. It is purified by recrystallization from dimethylbenzol. (Ap. Ztg.)

IODOTHYMOFORM.—When thymoform is iodized by one of the ordinary methods, a yellow powder rich in iodine is obtained, which is nearly odorless. It dissolves readily in alcohol, ether, chloroform, benzol and olive oil, but is insoluble in water and glycerin. Dressings impregnated with iodothymoform can be easily sterilized, as the melting point of the compound is above 150° C. (Ap. Ztg.)

GEOFORM AND CREOFORM are formed by the interaction of guaiacol and cresote, respectively, with formaldehyde. The combinations are free from odor and taste, are neither caustic nor irritant and free from toxic effects. They are soluble in caustic potash solution and are reprecipitated on acidulating the solution. They are soluble in alcohol, ether and hot benzol, insoluble in water and petroleum ether. (Ap. Ztg.)

ARSENIC AS ANTIDOTE FOR THYROID EXTRACTS.—According to Bédard and Mabile, the administration of thyroid preparations in large doses causes disturbances in the heart's action. The symptoms are readily observed by experiments on dogs. If arsenic in the form of Fowler's solution, be administered, the animals will bear large doses of thyroid extract without disturbances. The authors regard it advisable to combine

the thyroid preparations with arsenic in therapeutic applications. (Ap. Ztg.)

THYMOFORM is prepared by a reaction between thymol and formaldehyde. It is a yellowish, tasteless powder having a feeble odor of thymol. It is readily soluble in ether, alcohol, chloroform and olive oil, insoluble in water, petroleum ether and glycerin. On boiling with sulphuric acid formaldehyde is split off. Thymoform is to be used for the same purposes as iodoform and dermatol. (Ap. Ztg.)

HAIR PREPARATIONS CONTAINING PILOCARPINE AND QUININE.—Hair tonic: (a) Pilocarpine hydrochloride 6 p., quinine hydrochloride 12 p., tincture of cantharides 100 p., Cologne water 200 p., distilled water, sufficient to make 1,000 p. Macerate 24 hours and filter.—(b) Tincture of Jaborandi, tincture of cantharides, Cologne water, of each 28 parts, Ess-bouquet 12 parts, distilled water, to make 480 parts.—Pomade: Pilocarpine hydrochloride 2 p., quinine hydrochloride 4 p., precipitated sulphur 10 p., balsam Peru 20 p., bone fat 500 parts. (Ph. Post.)

PREPARATION OF A STABLE SOLUTION OF ALUMINUM ACETATE.—The best results were obtained by Candussis, when acetic acid and calcium carbonate were first mixed, then the aluminum sulphate added and the solution filtered immediately after the end of the reaction. The author also found that a preparation, that will keep indefinitely, can be obtained by substituting a corresponding quantity of barium carbonate for the calcium carbonate. The solution so prepared does not gelatinize. (Ph. Post.)

POTASH PASTE, as proposed by Unna, consists of equal parts of caustic potash, burnt lime, soft soap, and water. This is called "pasta caustica" and is used as a caustic in several skin diseases. The action of the paste may be mitigated by suitable dilution with glycerin. To render the application painless, addition of 10 per cent. of morphine is directed. A similar effect is obtained by addition of 1 per cent. of atropine, while the extracts of belladonna, hyoscyamus and cannabls Indica, when added to the extent of 10 per cent., do not appreciably decrease the pain. (Ap. Ztg.)

COMPOSITION FOR FIRE EXTINGUISHERS.—As is well known, the effect of these apparatus consists in that the liquid contained in the extinguisher is caused to evaporate quickly by the fire, whereby a large quantity of gas free from oxygen is generated, which displaces the air, thus extinguishing the fire. One of the best recipes for the composition of such liquids is given by M. Raymond (Alkohol), viz.: Water, 1,000 parts; borax 40 to 60 parts; soda (anhydrous), 80 to 120 parts; sodium hydrate, 150 to 200 parts; ammonium carbonate, 75 to 100 parts; ammonium chloride, 200 to 280 parts.

COLLOIDAL (SOLUBLE) MERCURY.—Colloidal silver is obtained by addition of ferrous sulphate to a solution of silver nitrate containing ammonium citrate. The metallic silver separates as a fine, black powder, which is taken up by water, with a deep-brown color. Colloidal gold is formed by the reduction of a dilute solution of gold chloride with formaldehyde. The corresponding form of mercury cannot be obtained by either of these methods. Stannous nitrate is the reducing agent employed. A highly diluted solution of mercurous nitrate is poured into an also highly diluted solution of stannous nitrate. Both solutions must contain only sufficient free acid to prevent separation of basic salts. A deep-brown liquid is formed, from which colloidal mercury is separated by the addition of a concentrated solution of ammonium citrate. The brown color of the solution goes over into black, and a very fine black precipitate becomes noticeable. Ammonia is then added to neutralize the liquid, under stirring. The precipitate settles and is separated from the liquid in the usual manner. The greater part of the adhering liquid is removed by placing upon porous plates, from which it is transferred to a desiccator. Pieces of silvery lustre are obtained, which dissolve in water with a dark-brown color. (Ap. Ztg.)

CRYSTALLIZED CALCIUM METAL.—Since the memorable researches of Humphrey Davy on the decomposition of the alkaline earths, many methods have been suggested for preparing the metal calcium in the pure state. M. Moissan, in the current number of the *Comptes Rendus*, after showing that none of these yields a pure metal, describe two ways of preparing crystallized calcium containing less than one per cent. of impurities. The first of the methods depends upon the property possessed by calcium of dissolving in liquid sodium at a dull red heat, and separating out in crystals on cooling. By treating the mass cautiously with absolute alcohol the sodium is removed, and the calcium is obtained in the form of brilliant white hexagonal crystals. Similar white crystals of calcium can be obtained by the electrolysis of fused calcium iodide. It is noteworthy that calcium has usually been described by previous workers as a yellow metal; doubtless owing to the presence of impurities.—*Nature*.

OIL-COLLYRIA.—In view of the fact that eye-waters and salves are prone to decomposition or soon become rancid, Professor Panas proposes oils as vehicles for eye-remedies. While the alkaloidal salts, which are mostly used in eye practice, are nearly insoluble in oil, the free bases of these are sufficiently soluble to prepare solutions of the required strengths, 1 to 2 per cent. Olive and peanut oil are particularly recommended. They are deprived of free fatty acids by washing with alcohol and then sterilized at 120° C. On cooling to about 60° the alkali is dissolved. In some cases it is preferable to dissolve the alkali in ether and to add this solution to the oil, previously cooled to 30°. Oil-collyria keep for months, even when exposed to dust in open vessels. The therapeutic action is fully equal to that of the aqueous solutions and the effect just as lasting. These collyria are best applied to the eye, according to the originator, by means of a glass spatula, previously sterilized by heating, between the closed eye-lids. (Südd. Ap. Ztg.)

GUM EUPHORBIIUM.—In gathering this gum resin, used in medicine since olden times, the natives of Natal observed, latterly, that the knives employed for cutting into and scratching the plants became covered with a very firmly adhering coating of the gum resin, which protected the knife blades perfectly from all formation of rust. The government took the matter in hand, and it was found that even iron objects sunk in sea water were preserved entirely free from rust for two years by this coating. According to these experiments instituted at Chatham, an alcoholic extract (instead of the shellac heretofore used for the purpose) would be the best means of protecting metal ware and instruments from rust. A coating applied to woodenware, beams, and other objects exposed to attacks by termites is said to protect them entirely from these destructive insects. In bruising the extremely sharp gum resin great caution is necessary, since the dust entering eyes and nose causes violent inflammation of these organs. (Staats Zeitung; Sci. Am.)

WHEN WOOD WAS HEWN.—To determine whether a trunk was hewn in winter or in summer is of the greatest importance to buyers of timber, especially as regards building timber, since it is well known that timber cut down in summer represents a lower value than that felled in winter. Timber hewn during the resting period, i. e., between October and April, contains in its cells numerous starch particles which cannot be found in wood cut down in summer. Owing to this presence of starch the wood is coarse and impenetrable, since the starch closes the pores. For this reason, winter-hewn timber is exclusively employed for staves because, with staves from summer-hewn wood, the contents of the barrels are subject to evaporation through the pores. The starch contained in the winter wood is given a violet color by iodine. Hence, if the timber to be examined is coated with an iodine solution and the surface of the felling side appears yellow, it may be assumed with certainty that the respective tree was hewn down in summer. The light yellow lines are the moisture rays, while cells, tissue, and wood fibers simply take on a yellow coloring. In the case of winter-hewn timber the amylose rays form much darker, ink-colored, black stripes on the yellow ground. (Allgemeine Technische Zeitung; Sci. Am.)

FERRIC ALGinate.—Alginate is a peculiar colloidal substance which Mr. E. C. C. Stanford isolated from seaweed. It resembles albumen in some respects, and combines with iron to form an alginate. Dr. Wm. MacLennan, of Glasgow, states that alginate of iron is a tasteless, brown, insoluble powder containing 10.2 per cent. of iron. Liquor ferri albuminatis, the preparation most akin to it, only contains 0.1 per cent. Alginate of iron is best administered in a fine powder. Children take it readily, owing to its tasteless character and absence of styptic quality. It is soluble in ammonia, but such a solution on coming into contact with the acid gastric juice would be decomposed. In doses of 10 to 15 grains, thrice daily, it has been employed in a number of cases of anemia and chlorosis complicated by functional or organic stomach symptoms, and it is found that the alginate was borne well, and even had a sedative action, but when it was withdrawn and the saccharated carbonate substituted, vomiting and pain returned. The alginate seemed to be rapidly absorbed, and a healthy complexion was soon obtained. (Chem. & Dr.)

EUGALLOL, LENIGALLOL, AND SALIGALLOL.—These are names applied to derivatives of pyrogallol, which have been experimented with by Dr. Kromayer, of Hall, in certain skin-diseases. Eugallol is pyrogallolmonoacetate. It is a substance of the consistency of syrup, semi-transparent, and of brownish-yellow color. It is easily soluble in water; dissolves readily in acetone, and is sent out diluted with 33 per cent. of acetone, in which form it is used in the treatment of psoriasis and similar troubles with fair success. Lenigallol is pyrogalloltriacetate. It is a non-poisonous white powder soluble in water, and is split up by alkalis. It is used as an ointment, equal parts of lenigallol and lanoline being applied, or it may be combined as a substitute for pyrogallol in various diseases in which it is desired to remove the excrescences. For treating eczema, especially of children, a much weaker preparation is employed, viz., ½ to 5 per cent. of lenigallol with Ulna's zinc paste. The third compound is pyrogalloldisacrylate. It is a body of a resinous nature, and forms with 2 parts of acetone or 15 parts of chloroform a sort of varnish. It is sent into the market combined with 66 per cent. of acetone, and is used for the same purpose as eugallol. (Chem. & Dr.)

THE ROMANCE OF ALUMINUM.—In "Nature Historiarum" (lib. 36, cap. 26), in which reference is made to an incident in Roman history which, up to the time of Sainte-Claire Deville, had been overlooked by scientists for many centuries, it is related by Pliny (23 A. D. to 79 A. D.) that during the reign of the Emperor Tiberius (41 B. C. to 37 A. D.) a certain worker in metals (faber) appeared at the palace and showed a beautiful cup composed of a brilliant white metal that shone like silver. When the artificer was presenting it to the Emperor he purposely dropped it on the floor of the chamber. The goblet was so bruised by the fall that it seemed to be irretrievably injured; but the workman took his hammer, and in the presence of the court repaired the damage without delay. It was evident that this metal was not silver, though it had almost the same brilliancy, besides being much more ductile and considerably lighter. The Emperor questioned the artificer closely, and learned from him that he had extracted the metal from an argillaceous earth—probably the clay known to modern chemists as alumina. Tiberius then asked the proud reply that the secret was known only to himself and Jupiter. This answer was sufficient. The Emperor had reflected that if it were possible to obtain this metal from so common a substance as clay, the value of gold and silver would be greatly reduced, so he determined to avert such a lamentable catastrophe. He caused the workshops of the discoverer to be wholly destroyed, and the luckless artificer was seized and decapitated, so that his secret might perish with him. M. Sainte-Claire Deville had no doubt that this metal was aluminum, and he asserted that the wanton cruelty of Tiberius had deprived the world of this valuable metal, which remained unknown for eighteen centuries. The extracting of aluminum, discovered by the Roman craftsman in the first century of the Christian era, thus became one of the lost arts. (Aluminum and Electrolysis; Sci. Am.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Queries From Non-Subscribers Not Answered.

Chas. S. Merritt, Troy, N. Y., and Geo. Hollands & Co., Hornellsville, N. Y., will please read the rules at the top of this column. Queries from non-subscribers are not answered.

Thialion.

(J. R. C.) "Thialion" is manufactured by the Vass Chemical Co., Danbury, Conn., and said by them to be "a laxative salt of lithia." The jobbing price is \$9 per dozen, net.

Odor of Ethyl Alcohol.

(W. T. C.) The sample of alcohol you submit answers all of the tests and we are unable to detect the "peculiar pungent odor" you describe. The odor of mixtures prepared with it must have been produced by something else.

Nitromuriatic Acid and Elixir of Phosphate of Iron, Quinine and Strychnine.

(H. Texas.) There is no precipitation or separation of the constituents of elixir phosphate of iron, quinine and strychnine when nitrohydrochloric acid is added to it. Water alone will cause such a separation.

Coloring Incandescent Lamp Globes.

(B. F. G.) The process generally recommended is to coat the globes with a thin solution of collodion, in which has been dissolved aniline of the required shade. For a general process for this kind of work see this journal, October 14, 1896, page 501.

Phenol and Antipyrin.

(E. S. E.) asks if the following can be mixed to make a clear solution?

Cocaine hydrochloride	10 grains
Sodium chloride	2 grains
Morphine hydrochloride	3 grains
Phenol (crystals)	15 grains
Antipyrin	20 grains
Water, enough to make	1 fl. ounce

No. Phenol (carbolic acid) with antipyrin forms an oily compound, which, upon allowing the mixture to stand for a little time, settles to the bottom of the bottle. A clear solution may be made by omitting the phenol if the prescriber permits.

Calomel, Sodium Bicarbonate and Essence of Pepsin.

(W. T. C.) asks what reaction takes place in the following:

Mercurous chloride	12 grains
Sodium bicarbonate	12 grains
Jalap	6 grains
Essence pepsin	3 drams

M. Sig. Take at bedtime.

The principal reaction is the reduction of the calomel by sodium bicarbonate. Should the essence of pepsin contain hydrochloric acid, there will be an evolution of carbonic acid gas upon bringing it in contact with sodium bicarbonate.

Paper Hangers' Paste.

(O. D.) Beat up 4 pounds of good white wheat flour in cold water—enough to form a stiff batter (sifting the flour first); beat it well, then add enough cold water to thin it somewhat and mix in two ounces of powdered

alum. Now, pour in boiling water until the paste begins to turn or cook, continuing the stirring until the paste is cooked. Paste cooked too much won't hang, hence it is necessary to stop pouring in the boiling water at the right moment. Level the paste off in a suitable container, and pour water on top to keep it from caking. Let it stand over night and in the morning it can be cut out in chunks, which may be wrapped up in strong paper and carried in the grip. For use the paste is simply thinned with cold water. The thick paste will keep for months.

Nitrohydrochloric Acid, Potassium Iodide, Spirit Nitrous Ether, Etc.

(C. O. S.) submits the following:

Dilute nitrohydrochloric acid	1 dram
Potassium iodide	1/2 dram
Spirit nitrous ether	3 drams
Tincture opium	1 dram
Bismuth subnitrate	2 drams
Peppermint water, enough to make	6 ounces

Teaspoonful four times a day. A more incompatible prescription could hardly have been written. Thus nitrohydrochloric acid is incompatible with nearly all of the other ingredients. Of course, the particular reaction depends entirely upon the order of admixture. The prescription should not be dispensed, as explosive, if not poisonous, compounds are likely to be formed.

Mettauer's Aperient.

(E. H. E.) We find no reference to this preparation in the index of the United States Dispensatory. The formula as published in Parrish's "Treatise on Pharmacy" many years ago was as follows:

Socotrine aloes, ...	5 drams
Sodium bicarbonate	11 drams
Valerian (contused)	1 ounce
Water	1 pint
Compound spirit of lavender, ...	6 fl. ounces

Make an infusion by maceration or percolation.

Dose, a tablespoonful, containing about 9 grains of aloes, 20 of bicarbonate of sodium and 14 of valerian.

A later formula given in the last edition of Remington's "Practice of Pharmacy" follows:

Aloes (in coarse powder)	300 grains
Sodium bicarbonate	600 grains
Fluid extract valerian	1 fl. ounce
Compound tincture of lavender, ...	1 fl. ounce
Water	16 fl. ounces

Mix. Macerate for seven days, and filter. Dose, a tablespoonful.

A Physician Who Dispensed.

(S) writes that nearly all of the doctors in his town fill their own prescriptions. One of them recently made up an eight-ounce mixture containing tincture ferric chloride, aromatic spirit of ammonia and compound spirit of lavender. When he shook it, it exploded, nearly blinding him, skinning his nose, driving a piece of glass into his hand and ruining his shirt and vest.

From the tone of this letter it may be inferred that the writer had in mind a thought which may be expressed in the words "a just retribution." He does not say so, however, preferring, possibly, to let the doctor "work out his own salvation" or destruction. The mixture is incompatible, iron being precipitated by ammonia. The explosion was probably caused by violently shaking the bottle, at the same time warming it in the hands and thereby causing the spirituous contents to expand beyond the capacity of the bottle. The doctor made his greatest mistake in writing the prescription, as it is incompatible. The explosion might have happened to any one as such explosions often do.

Cleaning Fluid.

(W. J.) The following is said to be a satisfactory fluid for cleaning nearly all kinds of cloth, carpets, woolen goods, etc.:

Castile soap	4 ounces
Boiling water	2 pints
Dissolve and add when cold	
Stronger water of ammonia	8 ounces
Ether	2 ounces
Alcohol	4 ounces
Oil wintergreen	1 dram
Water, enough to make	1 gallon

Electric Cleaning Compound.

- (2) White castile soap..... 1 ounce
 Ether..... 1 fl. ounce
 Glycerine..... 1 fl. ounce
 Stronger water of ammonia..... 2 fl. drams
 Soft water, to make..... 32 fl. ounces

To 16 fluid ounces of water add in the following order the glycerin, ammonia and ether. Shake well and add enough water to measure 32 ounces. Then add the soap (in fine shavings). Shake often for a few hours.

- (3) Stronger water of ammonia..... 1 ounce
 Soft soap..... 6 drams
 Sodium carbonate..... 2 drams
 Sodium borate..... 2 drams
 Ether..... 1 ounce
 Alcohol..... 1 ounce
 Water to make..... 2 pints

Effervescing Lithium Tablets.

(G. N. M.) Coblenz gives the following method:

Granulation I.

- Lithium carbonate..... 300 grains
 Sodium bicarbonate..... 1100 grains
 Powdered acacia..... 15 grains

Reduce the various constituents to a fine powder and mix well, spray with sufficient water to allow the mixture to be passed through a No. 10 sieve, dry thoroughly at 100° F., then force through a No. 16 sieve.

Granulation II.

Tartaric acid..... a sufficient quantity
 Heat to 170° F., or a temperature sufficient to melt completely, allow the fused mass to cool, then break it up, crushing sufficiently so that it may pass through a No. 16 sieve. The granules should not be coarser than No. 12 nor finer than No. 16. Dry thoroughly at 100° F. Of this granular powder weigh off 170 grains.

Mix well the 170 grains of granulation II. with the entire product of granulation I. add 5 cc. of liquid petrolatum (as ether spray), mix without crushing the granules, dry till ether evaporates, then compress into 100 tablets. It is very important that the granulation be perfectly dry before feeding to the machine. Each tablet contains 3 grains of lithium carbonate and weighs about 31 grains.

Hair Tonic.

(J. R. C.) The following are typical formulas:

- (1) Oleo-balsamic mixture, N. F..... 4 fl. ounces
 Glycerin..... 5 fl. ounces
 Rose water..... 20 fl. ounces
 Tincture cantharides..... ¼ fl. ounce
 Aromatic spirit of ammonia..... 1 fl. ounce
 Alcohol, enough to make..... 32 fl. ounces
 (2) Quinine sulphate..... 1 ounce
 Cologne spirits..... 48 ounces
 Fluid extract jaborandi..... 6 ounces
 Glycerin..... 48 ounces
 Bay rum..... 24 cc.
 Water..... 48 ounces
 Rose water..... 84 ounces
 Vinegar of cantharides..... 6 ounces

Triturate the quinine in a mortar with the vinegar of cantharides; add the water and enough acetic acid to entirely dissolve the quinine; add the glycerine, cologne spirits, bay rum, fluid extract jaborandi and rose water; add color, either red or brown, as may be desired, and filter. This is said to be an excellent hair tonic (Griffiths).

- (3) Roseolin..... 5 parts
 Alcohol..... 100 parts
 Cologne water, of each..... 2 parts
 Castor oil..... 6 grams
 (4) Balsam Peru..... 2 parts
 Oil bergamot..... 0.25 cc.
 Oil anilin, ethereal..... 0.25 cc.
 Alcohol, 90 per cent..... 20 cc.
 Glycerin..... 20 cc.

The Prescription Case and Pictures.

(Ozone) writes: We are modeling a new prescription case which is very large, extending across the whole of the store. In the center there is a large plate mirror and above the mirror there is space for a diploma. Now we think it a good plan to put engravings of some of the "old vets" in our line on each side of the diploma and a little below it. What do you think of this plan to give the impression we desire and to honor our fellow workers before us? Also where can we get suitable engravings of Paracelsus, Valentine and others?

This scheme is a very good one and much more appropriate than that of exhibiting framed advertisements

and patent medicine chromos followed in many places. The lives of the "fathers" in medicine and pharmacy deserve to be honored much more than they are. The public knows, little, if anything, of these great men. What is worse, but few people care to know. The scheme, however, is a good one and if the portraits can be well placed, with legible and appropriate titles underneath, they may prove of interest to some.

Dealers in old prints here tell us that portraits of a suitable size of most of the "fathers" of medicine and pharmacy are seldom picked up. Once in a while one may be obtained from some collector or antiquarian. Small pictures or engravings of quite a number of noted personages may be found in various old publications, but they would have to be considerably enlarged to answer the purpose you describe.

Advertising A Prescription Pharmacy.

(W. F. C.) wishes to impress upon the minds of the public that he makes a specialty of prescriptions and he says he wants to do it in the name of his store. As such name he proposes "The B Pharmacy" or "The Prescription Pharmacy" and asks our opinion of the scheme.

The desire of W. F. C. is a laudable one, but just how far it may be realized by use of the names suggested we are not in a position to judge. We believe, however, that the wording on the sign over a pharmacy should be something more than the mere statement "the prescription pharmacy." There is no individuality about it, and it is the individuality of the proprietor that carries most weight with the majority of the people, except, perhaps, in localities where the trade is wholly of a transient character. We believe, therefore, that the proprietor's name should be over his door, imprinted on his stationery and labels and be used in all his advertising. He may and should mention in appropriate manner the character of trade or specialty for which he caters. It is taken for granted he must say something of this kind, but it should follow his name; the idea he should convey is that his pharmacy is what he makes it. In the popular mind all pharmacies are supposed to be "prescription pharmacies" but there can be but one "W. F. C. Prescription Pharmacy." The wording on the pharmacist's sign, like all of the printed matter he may issue, should be appropriate, neat, and be made to reflect in the highest degree the dignity of the pharmacist whose business it denominates. Whatever the pharmacist undertakes to do to increase his prescription business should be done in a dignified manner. In his advertising for this patronage he can tell of his qualifications, of his assistants, methods for insuring accuracy in dispensing and many other things interesting to the outsider. The location of the store, and the character of neighborhood physicians determine to some extent the kind of advertising which shall be used for any locality, but whatever is put forth must be backed by the professional standing and ability of the "man behind the guns." The store should be pleasant and attractive, a place where good manners, cordiality, agreeable service and all of the graces abound. Such a store is largely an advertisement of itself.

FERRIC CHLORIDE AND SODIUM PYROPHOSPHATE.—P. Janzen (Ap. Ztg.) calls attention to the following prescription, the preparation of which may present difficulties to those unfamiliar with it:

- Liq. ferri sesquichloratis..... 5.0
 Natr. pyrophosphoricum..... 13.0
 Aquae..... 200.0

When ferric chloride is added to a solution of sodium pyrophosphate, white ferric pyrophosphate is precipitated, which dissolves completely, but slowly, in presence of an excess of the sodium salt. When the above proportions are adhered to a high-green, clear solution is obtained in about 20 minutes, if unnecessary warming be avoided. It is best to dissolve the pyrophosphate in one-half of the water, with aid of heat, cool and add the iron solution, previously diluted with the remainder of water. A milky liquid is obtained, which soon becomes clear. If the solutions are mixed hot, a turbid, brown mixture is formed. —The iron is contained in the solution in form of sodium ferric pyrophosphate. If it be desired to prepare this salt in dry form, it may be precipitated from its solution with alcohol and dried with a gentle heat.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XX.

NEW YORK, SEPTEMBER 1, 1898.

No. 9.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE	PAGE
EDITORIAL 271	Jubilee of Scientists: Annual Meetings of the American Association for the Advancement of Science and of the American Chemical Society 291
CORRESPONDENCE 273	The Appraisers' Conference 292
How to Successfully Conduct a Retail Drug Store 274	Protests Against War Prices: New Hampshire Druggists in Line; Millions of Revenue Stamped Out 293
ERA COURSE IN PHARMACY 275	
The Pharmacist: Necessity for Thorough Education; His Relation to Physicians and the Public; His Dual Capacity. 275	
ORIGINAL AND SELECTED PAPERS:	
Leaders of French Pharmacy feel the feelings aroused by the arbitrary advance of many manufacturers are intensely antagonistic towards those who would by such unwarrantable means shift the plain duty of every patriotic American upon others less able to bear it than they themselves. The enclosed came in our morning's mail. (A circular from a manufacturer who has rescinded his former action, and who will now pay the tax himself.—ED.) Use your pleasure about publishing this letter. We prefer not to call names, and would likewise extend the hand of charity towards one who, seeing the error of his way, makes haste to right himself. Yours truly,	LAURENS DRUG CO. Per Aiken, Manager.

APPROVES OF BUSINESS ASSOCIATIONS.

those of years ago. They are also aware that a review of studies and renewed acquaintance with elementary principles are great helps in keeping their knowledge up to date. The Era Course in Pharmacy offers a most desirable opportunity to pursue a systematic review of pharmacy. The method of conducting the course keeps up attention and interest. The time necessary to be devoted to it can easily be spared by even the busiest pharmacist, and the expense is but nominal. The expenditure of \$8 secures the Era, which every pharmacist should have anyway, and also provides for the quizzes and examinations by mail which are features of the Course.

Practicing pharmacists who wish to review their early studies under the guidance of competent instructors, and thus better equip themselves professionally, should send for prospectus, giving full details of the Era Course in Pharmacy. Both Junior and Senior classes begin work to-day.

The Pharmaceutical Era.
Box 1483, New York.

THE WORK BEGINS.

The lectures in the Era Course in Pharmacy for both Juniors and Seniors begin in this issue of the Era. The opening lecture is necessarily of a general introductory nature, serving as a sort of acquaintance-maker between students and instructors, and giving the former a warming up for regular scholastic duties. Question sheets will not be issued upon this lecture, but will begin with the lectures of next week.

The Dow Law in Ohio.

In the State of Ohio there is in effect the so-called Dow law, which imposes a heavy license upon all druggists who desire to sell liquor for other than strictly medicinal purposes upon physicians' prescriptions. Recently there has been particularly active search among the druggists for violators of this law, and prosecutions have been instituted all over the State. In the city of Sandusky, it is reported, all of the druggists save one have been found guilty of such violation, and will be compelled to pay in, each of them, to the county treasurer the full tax of \$350. Cases have been worked up by a special detective, who receives 20 per cent. of all returns for his efforts, and the reason for his remarkably active and successful campaign is easily disclosed by a little calculation of the remuneration which he will receive upon this basis. However, if the druggists have willfully and willingly violated the law, there is no reason to feel sorry for them. Of all men the druggist should be the last to fail in his obligations to the law and to the people, and he does lamentably fail when he turns his store into a rum shop. One feature of the Dow law which is peculiar and which makes it a very effective remedy against the wrongdoer, is that failure to pay the tax imposed makes the offender liable to lien, and if he does not pay up he can be sold out. Two or three cases of this sort have been recently in public notice in that State. It is understood that if the Sandusky druggists, against whom evidence has been obtained, promptly pay up their \$350 each, no penalty will be added. But if they resist, the cases will be fought to the end, and the 50 per cent. penalty provided for by the law will be added. Failing then to pay up comes the application of the lien upon the druggist's property. It is perhaps superfluous to state that the druggists are a little hot over the matter, and they threaten that if they are prosecuted they will retaliate by forcing the saloon men to close up on Sunday, which they have not been in the habit of doing heretofore. There is likely to be a little fight in consequence, and as everything in Ohio is politics, and a pretty poor brand of politics, too, we can imagine what an interest all this will arouse in the impressionable hearts of the politicians.

A Druggist-Governor.

The recently nominated Democratic candidate for Governor of Maine is a druggist; rather he is an apothecary and of the old school. The back room of his little apothecary shop has for years been the

club room and meeting place of the masculine gossip of the town and here seated on soap boxes (there are no chairs), around the fire, they have discussed and decided many a weighty question of politics and statecraft. The new gubernatorial candidate is an original, but enjoys the confidence and respect of his townsmen, and has gained not a little reputation outside the State, though he is a very infrequent absentee from his own fireside. Outspoken and frank in his manner, he offsets this, which might be under some circumstances an embarrassing and disagreeable characteristic, by the attribute of unflinching and unimpeachable honesty, which has won for him the title, both complimentary and descriptive, of Honest Sam. He has twice been the Mayor of his town, and it is expected that, if elevated to the Governor's chair, his administration of the affairs of that office will be as genuinely and generally satisfactory as have been his services in the lesser capacity. It is a compliment to the drug trade to have one of its members stand thus high in the appreciation of all classes, political and mercantile, and goes far to offset such a crazy charge (by implication) as that by the Druggists' League for Shorter Hours, of this city, that druggists are a lot of drug habitues, and addicted to all sorts of vicious professional and social practices.

Danger In Old Bottles.

The druggists of Greater New York have had their attention called, by circular from the Bottlers' and Manufacturers' Association, to the fact that it is a misdemeanor "to fill with any beverage, medicine, medicinal preparation or compound any bottle or siphon having produced thereon the registered mark of any person, without the written consent of or purchase from the owner of said mark." This is a wise law, and it is important that druggists know there is such a law, and undoubtedly it is not as generally known as it should be. Still, we do not believe a very large proportion of druggists pursue the practice which would make them subject to the penalties provided by this regulation. Druggists well know the necessity for having clean bottles for the wares they dispense, realize that they must know the family history, as it were, of their bottles, and seldom use any but those direct and new from the factory. Experience has proven to every small boy the mythical nature of his fondly cherished belief that the druggist is a ready and liberal purchaser of junk in the shape of old bottles gathered from the ash heap, the stable closet and the pantry shelves. One trial has demonstrated to the juvenile that supply and demand are not (to him) satisfactorily adjusted. Still there are far too many instances which justify the enactment of this law. Its prime purpose, of course, is to protect the financial interests of brewers and bottlers, but secondarily it acts, or should be made to act, as a very efficient protection to the public. It not infrequently happens that a customer extends an old beer bottle and requests that it be filled with horse liniment, ammonia, bug poison, carbolic acid or the like, and the druggist may, in his desire to please and to save the slight cost of a new bottle, comply with the request. Right here is the danger: the label may become detached, and there will remain no indication of the contents of the bottle. Its shape and the words blown in the glass may then very possibly and naturally lead to a tragedy. We do not think, however, that druggists as a rule require much warning of the danger of all this. It is the public which should be instructed and led to look upon it seriously. However, if the Bottlers' and Manufacturers' Association find violators of the law among

the druggists, there need be little sympathy for the offenders; they know better.

The Biking Woman and the Druggist.

An item is going the rounds of the newspapers to the effect that "the craze which women have for bicycling has had a demoralizing effect on one branch of the drug trade." It has caused a great falling off in the purchase of perfumes, soaps and all manner of toilet articles by the fair sex. We do not dispute this effect, but we take exception to the reason assigned for it, which is that women are not buying these things because they have found it necessary to save up their spare cash in order to buy their bicycles. We believe that the lessened consumption of face powders, enamels, toilet washes, fancy soaps and perfumes is due to the fact that the woman who rides a wheel finds her general health so greatly improved thereby that the fancied necessity for these toilet accessories disappears. With the blood in active circulation, sending the delicate hue of perfect health to the cheek, there is little necessity for an enamel or rouge. The wheel, if it has done nothing else, has banished many varieties of nervous disorders in the erstwhile hypochondriacal woman, has aroused a beneficial sense of the beauties of nature, of the excellencies of active outdoor exercise, and led to an optimistic acceptance of the belief that life is worth living, after all. She who comes in from a brisk spin with sparkling eye and perspiring pores has little use for lily white but wants some good, old fashioned soap and water, and the complexion left after this treatment outranks anything which can be shown by her who carefully protects her cheek from the rough wind, and looks upon the sun as an enemy to be avoided, if possible, fought, if must. It may be assumed from these remarks that we believe in the wheel, and we do, if used with judgment and not to undue extent, and we don't care if it does hurt the drug trade. Druggists themselves speak well of the silent steed, and will cordially agree in these sentiments.

In his advertising for this patronage he can tell of his qualifications, of his assistants, methods for insuring accuracy in dispensing and many other things interesting to the outsider. The location of the store, and the character of neighborhood physicians determine to some extent the kind of advertising which shall be used for any locality, but whatever is put forth must be backed by the professional standing and ability of the "man behind the guns." The store should be pleasant and attractive, a place where good manners, cordially, agreeable service and all of the graces abound. Such a store is largely an advertisement of itself.

FERRIC CHLORIDE AND SODIUM PYROPHOSPHATE.—P. Janzen (Am. J. Pharm. 1898, 1, 100).

Score One for the Druggist.

We have become so accustomed to saying, "poor druggist," and recounting the misfortunes which befall him and the abuses he suffers, that it is very refreshing to be able to record that in one particular, and in one city, he has been shown a little consideration by the authorities. A philanthropic citizen and official of Boston proposed to establish, and did establish, some free ice water fountains in that city, which proved to be a very great success with the public. However, the druggists very quickly felt the effect of this philanthropy upon their trade in soda water and other soft drinks, and by energetic protests have prevented the erection of more of these fountains, and hope to bring about the discontinuance of some or all of those now in operation. The public may feel aggrieved in this matter, may think that the druggists have no right to debar them from free

drinking water, and there may be many who cannot be thus coerced into patronizing the soda fountain, but will turn to beer. Without going into side issues and contemplating possibilities and all manner of quieting possibilities, we merely wish to remark that in this one instance the druggists are the upper dog in the fight—a very rare experience.

Neal Dow Still Needed.

Up in Biddeford, Me., a few days ago, a deputy sheriff made at a certain drug store the biggest seizure of bottled liquors ever heard of in that city. There were over 1,000 bottles of whisky, brandy, rum, gin and wines, and in addition there were numerous barrels of each of these beverages. These goods were not in plain sight in the drug store, either, but were concealed in carefully planned hiding places; mysterious false doors and closets. We imagine that the druggist will have a very hard time, in face of all this evidence, to prove that he is not a violator of the liquor law. It is a shame such rascals are allowed to parade under the cloak of a reputable profession and thus bring general discredit upon it. What would be a proper punishment to fit the crime? Something lingering in boiling oil would not be too much.

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

FROM SOUTH CAROLINA.

Laurens, S. C., Aug. 23.

To the Editor:

The Era is doing a good work—keep it up until more of the patent medicine shysters cry "Hold, enough!" The retailers have made them, and they can unmake them, if occasion requires. While we can report no concerted action by retail dealers in South Carolina, we do know that the feelings aroused by the arbitrary advance of many manufacturers are intensely antagonistic towards those who would by such unwarrantable means shift the plain duty of every patriotic American upon others less able to bear it than they themselves. The enclosed came in our morning's mail. (A circular from a manufacturer who has rescinded his former action, and who will now pay the tax himself.—Ed.) Use your pleasure about publishing this letter. We prefer not to call names, and would likewise extend the hand of charity towards one who, seeing the error of his way, makes haste to right himself. Yours truly,

LAURENS DRUG CO.,
Per Aiken, Manager.

APPROVES OF BUSINESS ASSOCIATIONS.

Oak Park, Ill., Aug. 22, 1898.

To the Editor:—Allow me to congratulate you on your article called out by Mr. Mann's plan of reorganizing the Michigan Pharmaceutical Association. Your remarks are most happily chosen, and should, as you say, make us think a little, nay a good deal, Mr. Mann's urgent appeal to strip the ship of pharmacy from all barnacles applies not only to Michigan—it applies to all State associations, and to the national organization as well, and is in line with the appeal of the Chicago Retail Druggists Association, to crystallize all local associations around one national body. The clamor for a step like this is general, and the hour is the accepted one. Mr. Mann says there might be "honorary members"; that is a good notion; there should be "dishonorary members" as well, at least we have use for such a class in Illinois.

For years the attendance at the meetings has diminished, because the average easy-going pharmacist dislikes the ruck and disorderly proceedings as annually carried on by some of that class; that is neither practical phar-

macist nor practical in anything but discord. Illinois meetings have year after year been disgraced by such convention professionals, who monopolize the time to such an exclusive extent that the discussion of "scientific papers" has to be cut short to please Mule Races. Hours and days are wasted by talking about the naval pharmacists, and free alcohol, if there is no free alcohol, and against free alcohol, when there is. These same agitators are so fond of opposing anything and all things that the very men who got red in the face against free alcohol are the ones that for ten years before talked against time for free alcohol. Draw the line, and let the pharmaceutical associations be run by pharmacists; not to please spleen or personal schemes. Jobbers, traveling men, teachers, all have their societies, why not we pharmacists?

Again I thank you and Mr. Mann, through your paper, that seems to be read in every State more than local drug journals, for starting the ball to rescue the associations from this unsavory herd of barnacles. Yours,

A READER OF THE ERA SINCE IT STARTED.

Chicago, Aug. 23, 1898.

To the Editor:—Let me suggest to you and Mr. Mann to request all State associations to adopt the motto: "None but registered pharmacists need apply." Yours,

ASSOCIATION FOR BUSINESS MEN,
F. BENDEL.

MORE PRIZE WINNERS. THE "PHARMACIST'S LIBRARY."

Grafton, Ill., Aug. 22, 1898.

To the Pharmaceutical Era:

The prize, "Lippincott's Pharmacist's Library," awarded me, has just been received, and I am highly pleased with same. Kindly accept my sincere thanks for your cordial congratulations and your courtesy in notifying me of my success. I feel that I have derived great benefit from the Era course, and expect to continue with the work. With best wishes for a continued success of the Era course, I am, yours truly,

W. T. ISTEED.

LIPPINCOTT'S MEDICAL DICTIONARY.

Arlington, Ia., Aug. 20, 1898.

To the Pharmaceutical Era:

I have the pleasure to acknowledge the receipt of your letter of Aug. 4, and also of the prize awarded to me. The winning of this prize makes my junior year doubly gratifying, as I already felt amply repaid for my labor in the benefit derived from the course of study pursued. Permit me to express my thanks to the management for the courtesies received during the course, and also to the generous donors of the prize. Respectfully yours,

WALTER SHUMWAY (175).

MERCURIAL OINTMENT PREPARED FROM COLLOIDAL MERCURY.—Colloidal or soluble mercury is prepared by the interaction of mercurous and stannous nitrates. Metallic mercury is thus produced in a condition in which it is soluble in water, with a dark brown color. Dr. Suess reports the following results from the preparation of an ointment of this form of mercury: The mercury used was in black fragments of doll appearance, showing but little metallic luster, and dissolving in water to a not quite clear solution, which acquired a silvery-gray coloration on heating. A similar change in color was caused by caustic alkali and some acids. Under a microscope magnifying 370 diameters the aqueous solution showed exceedingly minute particles of yellowish-brown color. Upon paper the mercury could be rubbed up into a black powder, while dry trituration in a porcelain mortar caused separation of globules. For preparing the ointment, the fragments were moistened with a little water, rubbed up fine and then mixed intimately with the cold fats. The ointment was of a black-gray color, from which the mercury separated as a black powder on melting, or on treatment with petroleum ether. When the ointment was cautiously melted in warm water, the water dissolved the mercury. Ordinary mercurial ointment left small globules in the depression of the skin after rubbing for a few minutes, while the new ointment under the same conditions left only a black powder. (Ap. Ztg.).

HOW TO CONDUCT SUCCESSFULLY A RETAIL DRUG STORE.*

BY FRED R. DIMMITT, KANSAS CITY.

There are five cardinal principles to be observed in carrying out the above:

First—It is necessary that you use good judgment and care in selecting a location. Try to locate among a thrifty class of people, with whom there is a common link between you and them. No one can ever make a very great success if located in a neighborhood where he knows and feels the people are as a class, his inferiors. And this applies to the druggist who starts in a locality where the surroundings are composed of those who feel and act that they are his superiors.

Second—It is necessary to own your shop without any debts or mortgages, for but few stores ever succeeded that had from start to the finish, heavy debts and mortgages hanging over them.

Select your stock with great care, buying just such goods as you think will suit your locality, and buy in small quantities at the start, until you, later on, find out what your demands may be, and can put in your supply accordingly. Try in starting to pay cash for all you buy, and get all the discounts. Year by year this will grow on you to such an extent that it will become a part of your being, and you will make many dollars by it.

Third—Remember that it is very important that your shop be kept strictly clean from one end to the other. See that your shop bottles are wiped with a cloth, and thoroughly dusted every day, and your "patents" well dusted, at least once a week. Your bottles should be placed on the shelves, both systematically and alphabetically, your balsams together, as also your bitters, cordials, cures, elixirs, hair tonics, liniments, etc., and your tinctures, syrups, etc., alphabetically arranged, so that if you at any time wish to find anything in the store in the dark you can at once put your hand on it. Remember that nothing you can do will make a better impression on your customers than perfect cleanliness in your store and perfect system in everything.

Fourth—The relation you should bear to your customers and how you should treat them with extreme courtesy, from the smallest boy that comes in to the oldest man. Make them feel perfectly at home, and that you are anxious to please them. If you fail to have what your customers call for, say you are sorry, and that, if possible you will have it at a certain hour, or will send it to their home. If they call for a postage stamp, give it to them as though you were making a drug profit on it, or if they ask to use your telephone, grant their request in a pleasant manner.

Make it an iron rule never to discuss politics or religion with any one in your shop.

Fifth—The relation between the druggist and the doctor.

The druggist should treat every physician as he would any other upright, honorable man. He should show him that he is pleased to have all the business he can legitimately throw in his way. The druggist under no circumstances, should ever pay the physician any per cent. on his prescriptions. He should charge the doctor cost only for what he purchases and should pay the physician for waiting in his family.

Be sure of one thing, never under any circumstances, allow substitution in your establishment. Fill prescriptions just as written, and fully impress it upon the doctor that the above is an iron-clad rule, and he and the people at large will fully appreciate that you are an honorable, upright, conscientious druggist.

In a few remarks I would like to impress upon the druggists never to advertise one article and insist upon selling a customer another. Never sell Mr. Frowning a bottle of Smith's Balsam for 65 cents, and when Mr. Jennings come in charge him only 55 or 60 cents for it. As far as possible have a uniform price to all. Do strictly cash business if you can. Goods sold on time often make enemies; but cash customers continue your friends, if given pleasant treatment.

Treat your clerks gentlemanly and humanely. Pay

them all the salary your business will afford, and pay them according to their ability and integrity. Try to gain their confidence and respect.

The druggists should be gentlemanly and courteous to all traveling salesmen, for thereby they sometimes "entertain angels unwares." No business man ever loses by complying with the above, for the great majority of business to-day is transacted between this wonderful host of "gentlemen of the grip" and the buyers and sellers. A good traveling man will take but little of your time, and if he is well posted you will get value received in what you learn from him.

The druggist must advertise to the extent of his ability and there is an art in advertising nowadays. He must subscribe for one or more of the best drug and scientific journals, and always have the latest and most reliable price list at hand. He must be thoroughly posted in prices of all goods in his line.

And in conclusion, my brethren, allow me to beg you, never become a crank. It makes no difference how long you have been in business, or how old you may be; it matters not whether you work more hours and get less compensation than any other class of business men; or that you have sold millions of postage stamps and received no profit or thanks for such sales; it is immaterial whether 99 out of every 100 that use your telephone fail to say "thanks"; it matters not if you are called to the front of your store thousands of times just to hear "I wish to see your directory"; all of these are as naught, and I still beg of you not to become a Crank, with a capital "C," for a cranky druggist is the most cranky person on earth. Always smile, always be happy, and conform to the above suggestions, and you will live and die a proprietor of a "successful Retail Drug Store."

MERCURIAL OINTMENT PREPARED WITH PETROLATUM.—The extention of mercury by means of petrolatum is not practicable with the apparatus usually found in pharmaceutical laboratories. The intervention of some other ointment vehicle is therefore required. Lanolin extinguishes mercury easily and quickly but the product will be too soft. To correct this fault and to give the ointment the proper consistence Prof. Gay (Bull. de Ph.) has tried the addition of several substances, hard paraffin, white wax, carnauba wax, stearic acid and spermaceti, and has found the last mentioned the most suitable. The others give the ointment a granular appearance, but with spermaceti a uniform and tenacious product is obtained. The following proportions are recommended: Mercury 500 p.; woolfat, 75 p.; spermaceti, 75 p.; petrolatum, 550 parts. The mercury is triturated in a mortar with the melted woolfat, then the melted and cooled mixture of petrolatum and spermaceti added. Gay recommends also to prepare the ordinary mercurial ointment by substituting spermaceti for tallow and to use woolfat for extinguishing the mercury.

PREPARATION OF A STABLE CHLOROFORM WATER.—Miesler (L'Union Ph.) recommends the following method: To prepare chloroform water of always uniform strength, place 300 Cc. of distilled water into a liter flask with 4.6 Gm. of chloroform, accurately weighed, and shake until the chloroform is dissolved. This gives a solution containing exactly 0.5 per cent., since 0.1 Gm. of chloroform is used up in saturating the air in the flask. Chloroform water should be kept in small bottles, completely filled. The quantity of chloroform in aqueous solution may be roughly estimated with a 50 per cent. solution of potassium carbonate in water, which is added to the chloroform water until a milky turbidity is formed.

Two Cc. of 0.5 per cent. chloroform water requires 0.6 Cc. of potash solution, 2 Cc. of 0.4 per cent. chloroform water requires 0.9 Cc. of potash solution, 2 Cc. of 0.3 per cent. chloroform water requires 1.0 Cc. of potash solution. (Apo. Ztg.)

ILLORIP is a preparation claimed to be indispensable for cleansing beer pumps. It has been found to consist of crude caustic soda with 4 per cent. of sodium chloride. (Südd. Ap. Ztg.)

* Read before the Missouri Pharmaceutical Association, W. D.

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Pharm.D.
Virgil Coblenz, A.M., Ph.D.
Wilbur G. Compher, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heebner, Phm.B., Ph.G.
George B. Kaufman, B.Sc., Pharm.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G., Ph.D.
Edward Kremers, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.

CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison, F.C.S.
Oscar Ollberg, Pharm.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M., M.D.
Henry H. Rusby, M.D.
Samuel F. Sadler, Ph.D.
L. E. Sayre, B.Sc., Ph.M.
Wilbur L. Seville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wulling, Ph.G., Phm.D.

INTRODUCTORY.

The Pharmacist.

I.—Preparation for his Calling. II.—Duties and Functions in Active Life.

By CHARLES W. PARSONS,

Editor *Pharmaceutical Era*.

1.) The necessity and value of a sound education: system and thoroughness the keynote: training of the senses and faculties: how to study.

There is no royal road to learning, but of the many paths some are less difficult than others. The value of education cannot be gainsaid, and with its accession and increase comes a steady progressing augmentation of its worth and power. This is true in all vocations, but particularly so with reference to the liberal sciences and the so-called professions. Here knowledge is indeed a power. Other things being equal, he who is possessed of the more complete education holds decided advantage over his fellows, his is the greater capacity for labor and the surer and the more bountiful is his reward. But an education must confer real knowledge, ready at its possessor's hand for instant and appropriate application. Hence it is desirable, yes, necessary, that education be in systematic form, not a heterogeneous conglomerate mass of unrelated, irrelevant facts, but its items and classes duly arranged, labeled and shelved, in easily accessible shape, for ready response to their owner's demand.

Of two men, subjected to the same educational training, one may learn and not know, while the other, in the acquisition of his knowledge studies carefully the relation of fact to fact, their proper position in the chain of facts, and particularly their value with reference to the purpose of true education: this man learns and knows, and just to the extent that he makes his knowledge available and serviceable to him is he the gainer above the other who does not appreciate the importance of all this.

We have said that the many roads to learning vary greatly in their degree of difficulty. This variance is largely if not entirely consequent upon the character of the methods adopted for imparting and acquiring knowledge. The most difficult and at the same time the least valuable is what we may term the absorption method, where the learner is a passive agent, appearing in a sponge-like capacity, capable of holding a certain amount and no more. It is possible to squeeze a little or much from such a saturated sponge, but the process leaves it dryer and dryer with each squeeze. This may also be termed the parrot system or learning by rote, mere memorizing without understanding. Of little practical value is such learning, for it is not knowledge.

It is hardly necessary to mention the antithesis of this method, that which is at once the easiest and best. It is the method of system, where in each step the foot is firmly placed before the next stride is taken, where the foundation is laid broad and deep, and where, as the superstructure rises tier by tier each brick and stone is

carefully examined to see if it is sound before it is laid in the mortar. Such an educational edifice is a true and valuable possession, always something for its owner to rely upon in time of need.

It follows, therefore, that system is the keynote to excellence in both the imparting and acquiring of knowledge. One may learn without system, but the task is a hard one, the errors are many and one must continually retrace one's steps to find the lost path, and only the bold-hearted and indomitable achieve the goal. We hear of the self-educated man: none but such an one knows the difficulties and discouragements he has surmounted; he is to be both pitied and admired. We applaud his success, but do not commend his experience as an example to others. There are easier and pleasant paths, and he is fortunate who can select these.

To him who desires knowledge we would say let him exercise his greatest wisdom in the selection of the method for its imparting and its reception. See to it that this method has system and thoroughness for its prime characteristics, and that its pursuit be both systematic and thorough.

Coming down to the application of these truths and arguments to the immediate subject to be here discussed, let the first thought to fix in the student's mind be the necessity for a logical method and a thoroughness of study. With these learning becomes a pleasure, a recreation, not a task, at each step there opens before the traveler's eyes an extended and ever extending vista of delight. The student of the art and science of pharmacy will find this notably true. There is a fascination about the discovery of chemical truths, of the beauties of the plant world, of the wonders of living forms, which remains not only throughout one's entire scientific training, but gathers force with each successive unfolding of nature's mysteries.

The student of pharmacy then will, or may, find his task an ever increasing pleasure. But for this result it is necessary to carefully avoid certain vital dangers. He must avoid hap-hazard measures in study. He should by all means see that his primary fundamental education is sound. As all sciences, pharmacy demands a good preliminary education. The value of a sound knowledge of ordinary grammar school subjects, especially mathematics, cannot be too insistently iterated. Aside from the value of mathematics for mental drill, it is the very essence of chemistry, the key-stone of pharmacy. The atoms and molecules of this infinite universe are not thrown together in hap-hazard fashion, but carefully arranged in arithmetical order and proportion. There is

no chance here, but systematic design, and through the door of mathematics the student steps easily to the discovery and appreciation of the facts of science.

Pharmacy is peculiarly a profession which demands of its followers the security consequent only upon thoroughness, and the preliminary education, so-called, is the first step in thoroughness. In education, particularly pharmaceutical education, there is more than the training of the memory alone. The other faculties and the senses must be brought to constant drill. It is astonishing how the senses of taste and touch and sight may be trained to a degree of high efficiency, and this is especially desirable in pharmacy. Delicacy with accuracy in manual manipulations is an accomplishment here extremely valuable. But we would particularly emphasize the importance of training the faculties of observation. Learn to observe and to reason from observation. The habit of reasoning makes study easy. It brings facts to relationship, it builds the steps of progress. Observation and logic render available the statements acquired through reading and hearing.

To most profit from the instruction afforded by the lectures which are to follow in this Era Course in Pharmacy, the student should map out his system of study and adhere to it faithfully. Set aside one hour daily, or two hours or more, as necessary or possible, for study and reference reading, and allow nothing to break in upon this arrangement. At first, do not depend upon your own judgment as to what and how to study. Do not roam carelessly from book to book, from subject to subject. Begin at the beginning and master each step before undertaking another. Read each lecture through once or twice, until its general nature is understood, then take it up sentence by sentence and paragraph by paragraph, studying each until it is fully comprehended and its statements orderly arranged in the mind, before proceeding to the next. Try to express the same fact in different form to test your knowledge of it. Discover and fix in comprehension its relation to its predecessors and associates. In other words, be thorough. If reference reading is suggested, be sure to understand as well as read. All this quickly becomes a habit, and a habit which will lighten and render attractive all your future studies. A little knowledge thus gained is infinitely more valuable than a great mass of undigested and indigestible unrelated material. In short, be both systematic and thorough, for here lies success and satisfaction.

(2.) Aim of the Era Course: the development of the theory and art of pharmacy.

The Era Course is planned to make such system and thoroughness easy. It is the exponent of the ripe experience of our best pharmaceutical teachers, who know the necessities of the student, and how best to meet them. It is so arranged that the subjects are considered in their natural and logical sequence, and a careful adherence to this order is earnestly advised in order to reap best results. The course aims to expound both the theory and art of pharmacy. The art is based upon and derived from the theory, hence the latter must first be thoroughly mastered. The main theory is an aggregation of a number of component theories. Pharmacy places under tribute various sciences, and each will be studied in its proper turn and place. The primary study of theory requires the exercise of some faith, the blind acceptance of mere statement of facts, but soon comes the ability, through training of the faculties and senses, to prove these facts, and place them in their proper position as truths. Here begins the art, and thence forward theory and art go hand in hand, art being but the application of theory.

(3.) Importance of Reference Works and a Good Library: How to Use Books; the Service Afforded by Current Professional Literature.

While it is possible to pursue this course with a fair measure of success with no means other than the lectures here published and the accompanying questions and examinations, added benefit may be derived by the student if he have at command proper reference books for collateral study. A large library is not necessary, nor, at first, desirable. There may be but few books, but it is imperative that they be good ones. The knowledge of how to use books is a most valuable acquisition and cannot be too strongly emphasized. A truth may be made plainer, more easily comprehended, by being stated in

varying manner, and this variance of statement of the same facts is a function of collateral and parallel reference reading. A good book, too, remains good, and a well selected library of reference works does not lose its value at the termination of the student's course of study, but will continue of constant service throughout his entire professional career. Therefore, the student is advised to secure as many good books as his means will permit. He will find them very efficient tools of his trade at all times. For the purposes of this course he should have at least one standard work on each of the subjects discussed by the several lecturers. Do not be hasty in choice, however. Wait till you definitely know what is desirable. Books are valuable only if used, and the lecturers will, when necessary, advise regarding choice.

The proper use of books is a matter of importance. In reference reading, do not read as you would a story, chapter succeeding chapter, but only such portions as may be necessary to farther and fully elucidate the point under discussion. Used in this way, reference books afford their greatest assistance, and in such reading be sure that each statement and its relation to the subject in hand be thoroughly comprehended.

Treat your books as personal friends; preserve them carefully; call upon them frequently, make them what they should be made—true assistants in your studies. In this way they become a delight and of ever increasing service.

If the pharmacist is to achieve his highest efficiency, he should sedulously cultivate the habit of reading. Life in its entirety is but a continued study, and early habits of study will serve in good stead in later practice. To keep well up to date one must continually read the literature of the day, and to the practicing pharmacist none other of this literature is so serviceable as his trade journals. They post him in matters pertaining to both his material and professional interests. The trade journal is likewise of great assistance to the embryo pharmacist the student, and he is earnestly advised to read current pharmaceutical literature persistently and habitually. Well preserved and complete files of pharmaceutical journals ably supplement the reference library, and with the passage of years constitute a veritable storehouse of inestimably valuable professional information.

(4.) Keep up with the Lectures; the Note Book and How to Use It; Value of Written Exercises.

In the study of this course the student should strive to keep up with the lectures. If he once gets behind, it is exceedingly difficult to catch up, he is apt to lose interest, to become discouraged, and his task seems to him greater than it really is. Study is much facilitated, the work rendered lighter, if a notebook is carefully kept. Jot down in this notebook the salient features of each lecture as they are developed. The mere manual act of writing serves to fix these points in mind and their mastery is thus greatly facilitated. A properly kept note book is of great assistance in inculcating habits of system and orderliness, beside its value as a key or synopsis of the lectures. It is an index of subjects, showing them in their proper order and relation. In the use of the note book slovenliness is to be avoided. Accuracy of statement is essential, as is all care to use correct phraseology. Notes carelessly inscribed, the use of abbreviations and merely indicated phrases, together with illegible penmanship destroy the value of notes, as they cannot be read when cold. An excellent means of training in addition to the note book, is the writing out at length of your comprehension of the lecture. When you think you have mastered the lecture, lay it aside, and test your knowledge of it by a written recitation upon it. Then by comparing this with the lecture, defects, inaccuracies, omissions, may be detected and remedied. When circumstances allow, it is an excellent plan for two or three students to meet regularly for the purpose of quizzing one another upon the work. The quiz is one of the most important features of regular college instruction, and that which the quizzes, by correspondence, in this course are designed to provide. In all written exercises the student should observe the greatest care in phraseology. The art of expressing one's thoughts with accuracy is an accomplishment peculiarly necessary in all scientific work. A standard dictionary should be always available, and frequently consulted to clear up points in spelling, diction and

shades of meaning. Deficiency of education in these respects is realized and deplored by many a pharmacist, and is the reason so few, relatively, are found among the contributors to their professional literature. A celerity and knack at writing are easily acquired, but constitute none the less an enviable and far too rare accomplishment.

It may be thought that too much stress is placed upon the desirability of these accomplishments, that all this advice is made to assume undue importance, but experience, the greatest teacher, demonstrates to every student that care in details contributes to the best results. The best way is generally the easiest way, and we want every student in this course to follow the easiest and best.

(5.) Practical Exercises; Follow Directions Implicitly and Keep Full Notes; Importance of Care and Cleanliness; Learn to Observe; Only Small Equipment Necessary.

From the foregoing remarks it can readily be inferred that in the conduct of the practical exercises mapped out to illustrate the work, the observance of detail is imperatively necessary. In the experiments, the directions given should be implicitly followed. In chemistry, for instance, if the student is instructed to place a few drops of a reagent in a test tube, let him be sure that only a few drops are taken. The success of the experiment may and probably does require rigid observance of this direction. If a precipitate is to be washed on the filter, wash it to the full extent of washing directed. If the instructor tells you to note this or that result, note it. Exercise your reason, ask why continually and be not satisfied until you find answer to every why. Chemistry is a peculiarly logical science, there is a reason and an explanation for every reaction. Ascertain what and why they are. Logic and reasoning by induction and deduction are in constant requisition here.

For the practical work outlined but very little in material and apparatus is required beyond the resources of the ordinary drug store, to which it is assumed the majority of students have access. Expensive and extensive equipment is not only not necessary but not desirable. The simplest apparatus, within reason, the better. The fathers of chemical and pharmaceutical science employed but crude aids in their historical achievements, the law of gravity was suggested to Newton by the fall of an apple, and the instruments which constituted the means by which Franklin demonstrated the truth of his theories were but a key and a kite.

II.

(6.) The Pharmacist's Relations and Position in the Community; Confidential Adviser to the Public; Aid to Physician.

The intent of all the foregoing will have been wholly missed if it has failed to impress upon the student the sense and significance of the undertaking upon which he has entered. The aim of this course is not to afford a short cut to the practice of pharmacy, nor primarily to equip the student to successfully undertake the board of pharmacy examination, but to provide a sound and comprehensive professional education, fortified by which he may discharge with credit the duties and obligations which are to come to him in his chosen calling. There is need for such a course of home study. Never before has there been so much demanded of the pharmacist in the way of professional attainment. The standard of educational equipment is being continually advanced, and he who is best provided in this respect is the surest winner in the race for professional recognition and financial reward as a pharmacist. The student cannot, therefore, afford to let pass by any opportunity for this qualification.

Time was when the apothecary could gain all necessary knowledge through apprenticeship, but while practical shop experience is to-day as valuable as ever, book-learning has acquired extraordinary importance as a requisite. This teaching is best provided by the college instruction, but the colleges cannot supply all the demand, and a system such as this, approaching as nearly as possible the best college curriculum, meets the needs of very many, even the majority, of those preparing to enter the calling pharmaceutical.

(7.) Twofold Nature of Pharmacist's Calling: Mercantile and Professional. Must be well Equipped in Each.

The student, actuated by the proper motives, should at the outset appreciate the dignity of his choice, the

seriousness of the duties later to be his, and with singleness of purpose and faithfulness of labor prepare himself for them.

The pharmacist occupies a peculiar position in the community. Much is, and in reason and right, demanded of him. He is the intermediary between the public and the physician. His the function to protect the former through the proper execution of his duties to the latter. He is the confidant of both and the custodian, in many instances, of the secrets of both. For this dual relation he must be a man of strict integrity, of liberal general education and of special professional knowledge. He must have a keen, even sensitive, appreciation of the rights of each, and in all his acts be guided by the only consideration of justice and safety. While this is not the place nor the course of lectures the proper means for a homily on his moral obligations, yet it is well to allude briefly to them to emphasize the fact that the modern pharmacist is something more than a mere seller of drugs.

The pharmacist, as has been said, fills a dual role. From his former occupation as a simple compounder of medicines he has, through resistless circumstances, been compelled for his subsistence to adopt this and that line for mercantile profit, until to-day he is in many respects a rather unique personage, occupying a unique position among tradesmen and among the public at large. He is still, as ever, and to the same or greater extent, the physician's indispensable assistant, but this function constitutes as a rule but a minor part of his occupation. He is first, of course, the apothecary, but beside he must be a thoroughly trained merchant to successfully cope with latter day conditions. The causes contributing to this development or evolution of the ancient apothecary into the modern druggist are difficult to arrange categorically, but they are manifold. The druggist might possibly, had he possessed the wisdom of foresight, have been able to better shape to his profit the forces and circumstances he has been obliged to meet, but be this as it may, he is what he is, and as what he is must he be considered. Undoubtedly the most potent factor in the production of the modern druggist has been the unlimited competition peculiar to a free and enlightened community, existent in its widest extension under the principles of a republican government. Opportunities for competition are not quite so great in the majority of European countries, where the restrictions upon the professions are more stringently applied, and there the financial reward of the more limited number of pharmacists is proportionately greater. But everywhere, though in varying degree, the conditions and forces of which we speak are prevalent and insistent. The pharmacist is compelled, without his volition, to be a merchant, a seller of trade commodities entirely foreign to his art pharmaceutical. Unfortunately, the public is prone to lose sight in large measure of his function as a highly equipped professional, and to consider him first and principally a merchant.

(8.) The Professional Side of the Pharmacist's Calling.

It is not desirable, however, to discuss here what he might be under more favorable conditions, but we are forced to consider him as what he is. Recognizing then his dual nature, let us first appreciate his duties, responsibilities and privileges as the disciple of an art and science. On this professional side obtrude many questions. His mutual relations with the physician constitute delicate problems for solution, and any straining of these relations on either side leads to immediate grave results. The pharmacist's relation to the physician is confidential and protective and failure on the former's part has created numerous evils which threaten the absolute divorce of the two professions, a result most earnestly to be prevented, as it would mean the total destruction of pharmacy as a distinct and advanced calling. The greatest of these evils is caused by the pharmacist's assumption of the principal one of the physician's duties and prerogatives, while lacking the qualifications for such assumption. This evil is the so-called counter-prescribing, and he who proposes to follow pharmacy as a life work cannot be too strongly warned against the folly and danger of falling into this error. It is professional suicide. The pharmacist is no more qualified by education

or training to prescribe for disease than is the pothouse politician to assume the direction of a nation's affairs, and yet both in their fatuous ignorance are willing to attempt these impossibilities. The physician has, truly, given cause for this retaliation, but two wrongs do not make a right, and neither is justified in his deviation from the path of rectitude.

The pharmacist, to be true to himself and the precepts of his avocation, must ever watch diligently against this error, the gravest menace to his highest success, sure to destroy his reputation for probity, reliability and qualification. Whatever the doctor's faults, whatever the irritation, remember first and always to render unto him those things which he is, and this is the greatest of them all. No excuse will hold for the usurpation of this right. It is the distinguishing function of the physician, and is his alone.

Paltering with temptation and laxity in this matter of counter-prescribing lead easily and inevitably to that other evil practice, "substitution," which is in any and every sense naught but bare-faced cheating. By substitution is not meant that peculiar habit which so greatly worries the patent medicine man and his ally, the newspaper. That substitution may be, and generally is, entirely honorable and honest, and is merely ordinary trade-self-protection. But it is the real substitution which is a crime, the deceptive substitution in a prescription of ingredients other than directed. The whole object of the pharmacist's training is that he may be competent to compound prescriptions with accuracy, as written. If he tampers with the prescription to any extent whatsoever without the physician's permission he is a cheat, and utterly unworthy of confidence in any respect. These are harsh words, but they must be severe to fully characterize the practice named. The pharmacist is nothing but the preparer, and not the prescriber, of remedial agents. Carelessness or ignorance on the part of the physician may result in dangerous or inaccurate prescriptions. It is the duty of the pharmacist to detect such faults, but not his right to correct them. He can, in such cases, do nothing but refuse to compound them until the errors are corrected by him who made them. A full comprehension of this fact and strict compliance in act therewith will save the pharmacist much annoyance and prevent most if not all the abuses of his prerogatives with which he is now charged by the physician. The latter's skirts are by no means clear, but our only concern here is that the pharmacist's may be.

But the reader of these words knows, if he is already in the practice of pharmacy, or will know soon enough when he enters upon it, what are and should be the mutual relations between the pharmacist and physician. It is a matter wherein each must work out his own salvation. A correct and keen sense of right is a better guide than reams and volumes of advice and admonition.

While the student has been pointed to some of the pitfalls which will beset him and must be avoided, he should not let this lead him into a pessimistic attitude concerning his choice of a profession. Pharmacy, when all is said that can be said against it, is yet a grand calling, capable of almost infinite expansion beyond its present bounds, and holding out promise of highest emolument to its earnest, single-hearted devotees. It will give fullest exercise to the highest scientific attainments, and confident to and concomitant with this extension is the financial success which is the main incentive to its choice. The thoughtful pharmacist to-day recognizes that year by year more and always more will be required of him, and the trend of all pharmaceutical education is to better equip him to meet these demands which are sure to be made upon him. The future pharmacist must be both more generally and specially educated. He is to be in fact as well as name the common chemist of the common people. He is to be the sanitary analyst, the bacteriological expert, the microscopist for the physician, the specialist in numerous lines which the nineteenth century has created and the twentieth will extend. There are many who see in the not far distant future the total divorce of the professional from the mercantile, which in their present ill-assorted union are causing so much irritation and perturbation of spirit.

It behooves the student, therefore, to plan his educa-

tional equipment upon broad and sound lines that he may be ready to adequately meet the requirements of the new pharmacy.

(9.) The Pharmacist as a Business Man.

Self-preservation is the first law of nature, and it is proper as well as natural that in choosing pharmacy one should ask whether it will afford a livelihood for himself and his. At no far remote past period the answer could be an instant and unqualified yes; for then the financial profit was both large and prompt; even to him who was the possessor of but few of the attributes now so generally recognized as essential to mercantile success. But competition now is fierce, and beside the purely scientific qualities one must be a shrewd business man to get his fair share of monetary reward. There is nothing derogatory in this, on the contrary it is commendable and honorable, so long as business shrewdness is not held synonymous with trickery and sharp dealing.

The necessary business training can be secured best, perhaps only, in the hard school of experience. It cannot be formulated into printed lectures nor inclosed within the pages of a text book. The drug business requires a business qualification peculiar to itself, and varying in degree and kind with circumstances and surroundings. There are a few general precepts, however, which it may be useful to briefly mention. The modern drug store, as regards its business nature, must be conducted as are other businesses. There must be in employment a sound and adequate system of bookkeeping; the general stock must be kept in a salable condition and well assorted to meet the requirements of the trade sought; the clerks should be good salesmen in all the term implies; the advertising methods must receive constant attention; all the best rules and methods of stores in ordinary are to be carefully observed. The druggist enjoys exceptional advantages for the profitable extension of his trade. His show windows are generally considered the acme of perfection for display purposes with the nature of the stock he carries. He can, with little effort and expenditure, build up a highly profitable trade in household specialties, for the preparation of which his professional education has equipped him. He must avoid the mistake of giving all merchandise for free publicity, and thus sink his methods for little or no profit. As a tradesman, he is entitled to a fair profit, as are other tradesmen, and to no more, but as a professional man he is entitled in exacting a professional profit as reward for the "know-how" under no circumstances should he demand professional profit upon mercantile commodities, nor vice versa. In brief, in business be a business man; behind the prescription case be the careful, conscientious, competent disciple of an honorable and honored profession. The two can be conducted along parallel lines, but must not meet, they do not mix without incompatibility.

The discussion of any one of the many points here but lightly touched upon could be profitably extended to great length, but most of them will severally receive competent attention in papers to appear at intervals in this lecture course, hence call for no further mention here. These few remarks are intended merely to serve as sign posts, pointing to some of the more prominent paths among which the pharmacist must pick his way. They are suggestive merely, but recognized at the outset may be of service to the student for his proper direction.

(10.) The Pharmacist and the Laws.

A few concluding words may be well devoted to the matter of the pharmacist's relation to the laws. He should make it a duty wherever he engages in business to acquaint himself with the laws he is expected to observe. The druggist is under exceptional restrictions in this regard, because of his grave responsibility. The laws must be protected against incompetency, and the laws provide this protection. The general pharmacy laws are a wise provision. They are not, as many mistakenly suppose, to protect the pharmacist's interests and afford him special benefits and advantages, but their sole purpose is to guard the lives and health of the community against the dangers of ignorance on the part of the dispensers of medicines. No paternalism nor class legislation is this, but laws which should and must be respected. Of the same nature and intent are the poison laws. They may be faulty, in some cases may bear hard upon the druggist, but the individual must be sacrificed, if necessary, to the public good, in purposes, and in their sole purpose are most excellent and necessary regulations. The most troublesome laws, however, those which are frequently inequitable and onerous in their workings, are those ostensibly designed to control and manage the sale of the sale of intoxicating liquors. But here, too, as with all other laws mapped out for his observance, the druggist can easily discover the right and safe course to follow. It is hardly necessary to mention the prohibition of the sale of improper and immoral articles. The right kind of druggist engages in naught of this nature; to the wrong kind it is useless to extend admonition or entreaty.

(Written for the Era.)

LEADERS OF FRENCH PHARMACY.**THE DIRECTORS OF THE THREE SPECIAL SCHOOLS.****I.—M. GUSTAVE PLANCHON.**

M. Gustave Planchon has now been Director of the Paris School of Pharmacy for 12 years. M. Chatin, his predecessor, an honorable and distinguished, but somewhat stern and unbending chief, became unpopular among the students on account of certain severities which they noisily resented. Lectures were interrupted, and things came to such a pitch in 1896 that the school was temporarily closed. Shortly after M. Chatin resigned, and M. Planchon, then professor of *Materia Medica*, was appointed in his stead.

No such revolt is likely to disturb the even tenor of the directorship of M. Planchon, who enjoys a popularity as universal as well merited. Is a new students' journal started? The sympathetic director's article appears in one of the first numbers. Do the Paris pharmacists seek

a hall to hold one of their large and frequently stormy meetings? The *Salle des Actes* of the School of Pharmacy is hospitably placed at their disposal; and (if a strictly neutral attitude is possible) the director may himself be present. Do the Paris Syndicate, the ex-hospital internes, or any pharmaceutical body, hold their annual dinner? M. Planchon is among the honored guests. Does a more respectful hush and a more interested attitude mark the monthly meeting of the Society of Pharmacy? It is M. Planchon's contribution to pharmaceutical history

GUSTAVE PLANCHON.

(that is being read in his somewhat low voice. Is any proposition set on foot to improve the status of the pharmacist? (the abolition of the second class diploma, for instance). It meets with him warm and willing support.

Now sixty-five years of age, a trifle gray and bent by the hard struggle that has won him the position of leader of French pharmacy, M. Planchon's manner is somewhat thoughtful and preoccupied, but singularly winning. Entirely without self-assertion, his kindly glance and smile quickly put his interlocutor at his ease, and his urbanity and courtesy in a great measure explain the popularity already referred to.

His official residence is next door to the school, with pleasant outlook on to the Avenue de l'Observatoire. A widower since 1890, one might say his real home and family are the school and its students; while the hobby of his leisure hours is the history of the establishment, which he has traced in four little volumes full of interest, the last one having appeared only a few weeks ago.

His "Practical Treatise on the Origin of Vegetable Drugs" (1876) and his new and revised edition of Guibourt's "Natural History of Simple Drugs," may be classed as standard works, while his "General Considerations on *Materia Medica*" (1879), and monographs on "Ipecacuanhas" (1873), "Jaborandi" (1875), and "Strychnos," etc. (1892), should also be mentioned.

The Two Brothers—J. E. Planchon.

It is impossible to trace his biography without alluding to his elder brother. The two boys were born at Ganges (Hérault), Jules-Emile in 1823, Gustave in 1832. Their father, a village artisan, owned little but a house and vine plot, and held the Protestant opinions which Louis XIV.'s dragonnades failed to crush out among these Cévennes mountaineers. The self-denial of the parents (and the boy's own intelligence and dogged perseverance) enabled Jules-Emile to fulfill his parents' ambition, and take his pharmaceutical diploma at the neighboring University of Montpellier. At 21 he took his Sc.

D. degree, and that of M. D. later on. From 1844 to 1848 he was at Kew Gardens (London), then became professor of Botany at Ghent (Belgium), 1849, at Nancy Pharmacy School in 1851, and at Montpellier in 1856. Three years later he was Director of the School of Pharmacy at Montpellier, where he died in 1888. He wrote several botanical treatises, but his great claim to the gratitude of his southern fellow countrymen was his discovery of the possibility of stamping out the phylloxera, which threatened to destroy the French wine-growing industry. His Kew experiences had given him a knowledge of English; his local associations and early years an experience of vine culture. In 1873, after three months in the United States, he returned with the conviction that the American graft could resist the insect pest. The rest is told in the

**J. E. PLANCHON'S MONUMENT, MONTPELLIER.**

monument raised in 1894 in a public square of Montpellier, where a vine-grower holds a bunch of grapes in front of the bust of J. E. Planchon, and the inscription below states that "The American vine gives new life to the French vine and triumphs over phylloxera."

Gustave Planchon's Career.

It was in a great measure, thanks to the example and help of this brother, that Gustave Planchon was able to enter upon a scientific career at Montpellier University. In 1857 he published some notes on the quaternary flora found in the calcareous "tufs" near the town; in 1859 he took his M. D. degree, and then spent two years in Switzerland botanizing and teaching. When passing his Sc. D. ordeal at Paris (1860) he presented a thesis on the tufs already mentioned. These deposits are supposed to prove that the vine and fig are indigenous plants in Southern France. His pharmacy thesis (he took a first-class diploma) in the same year was on "Quinquinas," and contains the first attempts at a natural classification of these

barks, according to their botanical origin. He was appointed assistant professor at the Montpellier School of Pharmacy, and only left there in 1866 to go to Paris.

M. Gustave Planchon is an active member of the Paris Society of Pharmacy, member of the Philadelphia College of Pharmacy, correspondent of the Society of Pharmacy, Philadelphia, and honorary member of the A. Ph. A. The British Pharmaceutical Society named him the corresponding member, and in 1889 awarded him the Hanbury gold medal.

M. Planchon was, on June 22, elected chairman of the Organizing Committee of the Pharmacy Congress for 1900, it being felt that his name would be a pledge to foreigners of the scientific importance of the gathering, while his general popularity would rally all French pharmacists. His official position also gives him exceptional facilities for approaching the French or foreign Governments, and assuring their hearty co-operation.

M. Planchon has also been appointed Vice-President of the Committee for the General Organization of other congresses in 1900 (Section VI., Medical and Pharmaceutical Sciences).

He was promoted officer of the Legion of Honor on July 14 (National fête day).

II.—M. SCHLAGDENHAUFFEN.

director of the Nancy School of Pharmacy, may be frequently seen at Paris, at the Academy of Science's weekly meetings. His residence at Nancy is in a quiet street leading from the University to the open country. A bronze bust of M. Schlagdenhauffen, presented to him on the occasion of his nomination to the Legion of Honor, adorns the drawing-room, and one may remark something of the rugged features and spare frame which often characterize the Alsatian.

Born in Strasbourg in 1830, Frederic Schlagdenhauffen studied at the Protestant Gymnasium, the Royal College, and finally the Faculty of Sciences of that city. Chemistry became his favorite subject, and it was his youthful ambition to enter one of the important chemical manufacturing of the region. Circumstances prevented the realization of this project, and turning his attention to the sister science of pharmacy, he graduated in 1851, and was immediately afterwards engaged on the teaching staff of the Strasbourg School of Pharmacy (Toxicology and Physical Sciences). A year's leave of absence in 1856 was spent at Paris as preparator in the dyeing class at the Arts and Metiers Technical School. Returning to his duties at Strasbourg, he became assistant professor of toxicology and physics in 1861, and in 1869 was appointed to a similar post in the chemical and physical section of the Faculty of Medicine. These were the palmy days of the ancient Faculty.

The Imperial Government had established its Military Sanitary School at Strasbourg, and 256 civil and 346 military students were inscribed at the faculty, not to mention 41 military pharmacy students.

Then came the war and the annexation. The Faculty of Medicine and the School of Pharmacy were transferred to Nancy, just over the frontier. M. Schlagdenhauffen continued his duties at both the new establishments, and was elected director of the Nancy School of Pharmacy in 1886. He is frequently called in as an expert in poisoning cases in the courts of justice of Eastern France, and is one of the best known and most respected citizens of the flourishing frontier town.

His scientific publications are numerous. Among the examination theses of his

"Physiological Chemistry," "Dragendurfs," "Chemical Analysis of Plants," Hoppe-Seyler's "Chemical Analysis as Applied to Physiology and Pathology," etc., while his shorter papers, in collaboration with various professors and friends, frequently appear in pharmaceutical and scientific publications.

M. Schlagdenhauffen was elected a member of the Paris Academy of Medicine last month.

III.—M. FELIX JEANJEAN.

was born at Montpellier in 1825, and has been connected for forty years with the School of Pharmacy, of which he is now a director. He is a relation of Balard, the discoverer of brome, and it was through the influence of this famous chemist that M. Jeanjean's attention was early attracted to scientific matters. His particular branch of instruction at the school was Organic Chemistry and Toxicology. After ten years as assistant teacher he was formally named professor in 1868, after taking his Sc. D. degree. Later on the title of the chair was changed to that of Analytical Chemistry and Toxicology. In 1894 he was elected director of the school.



M. JEANJEAN

M. Jeanjean's published works are not numerous. The most remarkable are his researches on the derivations of the sulphyranide and on the waters of salt crystallization.

He is better known as a skilful teacher and a first-class analyst; in the latter capacity he has frequently rendered valuable services in criminal cases, as well as acting frequently as arbitrator in commercial disputes. Five years ago the Legion of Honor recompensed his long and laborious career in the scholastic and scientific world.

He is little known in Paris, but I have seen him at Montpellier. Prof. Planchon (son of the late J. E. Planchon, already referred to introduced me to M. Jeanjean, remarking banteringly that I had elited the Toulouse Faculty of Medicine and Pharmacy as having laboratories equal to those at Montpellier. The director offered, as the best reply he could give, to show me all over the school, and a very pleasant hour or two I spent examining the details. A novelty to me was the chemistry class (practical manipulations), working in the open air under the glazed cloister. This it was explained to me, was to reduce unpleasant smells to a minimum when evil-odored substances had to be handled. "And in Winter time," said I. The director and professors smiled, there is no Winter worth speaking of in Montpellier, they told me, pointing to the palms and acacias in the quadrangle.

M. Jeanjean's services to agriculture were acknowledged last month by the presentation of the green ribbon of the Ordre de Merite Agricole by the French Government.



F. SCHLAGDENHAUFFEN.



OUT-OF-DOORS CHEMISTRY CLASS, MONTPELLIER

INDIAN HEMP.

How It Is Grown and Prepared for Use in Medicine and As a Stimulant.

BY WILLIAM MAIR.

Hemp is a holy plant of the Hindus. A guardian lives in the leaf of the "bhāṅg," as it is named in the Sanskrit, just as the wife of Vishnu lives in the hysteria-curing "tulsi," or Holy Basil, and as Shiva dwells in the dysentery-scaring bael (the B. P., 1898 notwithstanding). Oaths are taken on the bhāṅg leaf, and to one who forswears himself the bhāṅg oath is death. And yet, in some parts the phrase, "may hemp be sown in thy house," is one of the commonest of abusive imprecations, inasmuch as in many districts its cultivation is considered disreputable. The same plant that yields hemp fibre in Ireland produces narcotics in India; the same plant grown in Europe affords the familiar hemp seed that is given to cage birds. The resin-yielding hemp grows wild throughout the Himalayas from westmost Kashmir to the extreme east of Assam, throughout an area of 1,500 miles. It reaches down the southern slopes of the mountains into the Punjab and Gangetic plains, and occurs at altitudes as high as 10,000 feet.

The Indian hemp of commerce is not, however, produced from the plant in its wild condition, and it hardly occurs spontaneously in the districts of Bengal and Bombay, whence the drug, as it comes to London, is exported. Cultivation is confined in the first-named Presidency to a compact tract having a radius of about sixteen miles, under close excise supervision, and embracing about 1,200 acres, and about 5 per cent. of the produce, about 50,000 pounds annually, finds its way by sea to London. Rather over 1,000 acres are cultivated in the Bombay Presidency; about 30 per cent. of the crop, about 120,000 pounds, is exported to Aden, Arabia, Africa and Europe. The remainder is consumed in the country. Smaller areas are cultivated in Madras, and in some other provinces and States, chiefly for local consumption. It may be well to define clearly the three narcotic products of the plant:

1. "Ganja," which is cannabis indica, B. P., "the dried (unfertilized) flowering or fruiting* tops of the (cultivated) female plant of Cannabis sativa grown in India, from which the resin has not been removed," or which have become coated with resin in consequence of having been unable to set seeds freely.

2. "Charas" is the name applied to the resinous matter, when collected separately, which exudes naturally on the leaves, stem and fruit, and which contains, or is intimately associated with, the active principle. (It usually contains leaf dust, seeds, and other impurities picked up in the process of manufacture.) The "Pharmacographia" calls it "a foul and crude drug, the use of which is properly excluded from civilized medicine."

3. "Bhang" or "Siddhi," different names which are applied to the dried leaves of the hemp-plant, whether male or female and whether cultivated or uncultivated, and without any preparation other than drying. (It not infrequently finds its way into the markets as an inferior grade of the drug and as an adulterant of it.)

In the course of cultivation the plants are most carefully tended, and the males eliminated in order to prevent, as far as possible, the fertilization of the female, and by retarding the development of seed to increase the secretion of resin. In Bengal the natives talk of the ganja-bearing plant as the male, and the weaker, pollen-bearing plant, as the female. An expert or professional "poddar" is engaged for the operation, which takes place before the flowers have fully developed, and which requires some skill to distinguish the differences involved. The hemp doctor breaks over the plants which he decides to be male, and the cultivator plucks them out, filling the blank spaces with other plants. The male plant begins to flower in November, and the female in the beginning of January, at which time the cultivator is on the lookout for abnormal male flowers on the female plants, or "hermaphrodites," as they are sometimes called. The ganja begins to ripen about the middle of February, when it assumes a brownish color and sheds all the larger leaves, and is ready for harvesting. It is then that the name "shivajata" (cluster of hair of the god Siva) is given to the agglutinated flowers and leaves.

The finest ganja is undoubtedly that of Bengal. It is usually understood that the "compressed rough, dusky-

green masses, consisting of the branched upper part of the stem, bearing leaves and pistillate flowers or fruits, matted together by a resinous secretion," is intended to refer to the form of the drug as prepared in Bombay, as distinguished from the more active form of the drug produced in Bengal, in more cylindrical, not flattened pieces. Three forms are made in Bengal—"flat," including "flat, small twig" and "flat, large twig"; "round" and "chur."

The flat Bengal ganja was the original, and has always been the most reliable form, physiologically, of the drug as found on the London market. It was shipped via Bombay, but the generally inferior product of the Western Presidency has largely supplanted it, due chiefly to the fact that it is cheaper, and partly because of the somewhat heavy duty and restrictions imposed by the Government of Bengal on the manufacture of the drug. It was placed on record by the Hemp Drugs Commission (Report, vol. I, p. 96) that "the Khanda (Bombay) ganja differs from that of Bengal in being green in color, and having a much larger quantity of leaf left in it. The latter is a very special article, and no ganja will be found to compare with it in any province." This variety was adopted by the Hemp Commission as the standard for physiological comparison, and two out of three samples of the drug as grown at Ahmednagar, on the Bombay side, were found to just equal it in physiological activity. So that if the B. P. intends that both should be used, and there seems no reason why the better article should be excluded, it would be well that this should be indicated more clearly; the composition may be taken to be fairly constant, and the preparation is invariably careful. The "round" form of the drug is, of course, more active, and a superior product, containing, as it does, and as will be explained, much less useless and inert matter than the flat.

The following is a description of the principal details of the elaborate and technical process followed in the manufacture of cannabis indica at Naogaon, the centre of hemp cultivation in Bengal. It involves chiefly pressing, drying and removal of the leaf. Bright, sunny weather is essential to the best manufacture. The plants do not all come to maturity at the same time, and they must be manipulated within three or four days of maturity, or they become useless. The manufacture of flat ganja takes about three days, and is carried out on a piece of ground which has been specially leveled for the purpose. The number of plants handled in each three days' operations is usually about fifty or sixty. The first day the plants are cut in the morning, brought to the manufacturing ground and spread out in the sun till the afternoon. They are then cut up one by one into lengths of about 1 or 2 feet. Those having flower spikes upon them are retained, and the rest is thrown away. The portions selected are spread out in the dew for the night. The work of the second day consists in alternately pressing and drying the crop and getting rid of useless leaf and seed. The branches are piled by bundles of five or ten, flower-spikes inwards and overlapping, in a circular heap about 4 feet in diameter. The workmen tread this down, moving round upon it and supporting one another. A wicker mat is then placed over the heap, and the men sit or place weights upon it. After half an hour of the pressure the pile is unstaked, the bundles are taken off and beaten together over a mat to shake out the seeds and leaf. The heap is again built exactly as before, the upper layers of the previous heap being placed at the bottom of this, and the processes of treading, pressing, unstacking and beating are repeated. The bundles are now laid out side by side on mats and trodden individually, the workman holding the stem ends with one foot while he passes the other foot downwards toward the flower. The bundles have now been reduced in size, and consist of four or five twigs each. They are then laid in a slanting position over the bamboo pole on the ground and left for the night. The whole process is repeated on the third day and completed by pressing the twigs individually with the feet into flat masses in the way already described. The twigs are now gathered into bundles of two standard sizes, a certain quantity of large twigs in the one and of small in the other, and subsequently into the "robbins," in which the drug is delivered to the wholesale druggist.

The manufacture of round ganja is not complete until

* Fully fertilized seeds are plentifully produced, notwithstanding the precautions taken, subsequently described, to eradicate the male plants.

the fourth day after the plants are cut, and a great deal more of the woody portion is rejected than is the case of the flat variety. A horizontal bar of bamboo is lashed to uprights about a feet high, and mats are placed on the ground on each side of it. Bundles of twigs, either tied together by the stem-ends or not, according to the skill of the trader, are set out on the mats; the men range themselves on each side of the bar, and, holding on to it for support, proceed to roll the bundles with their feet. This is repeated, and the twigs subsequently hand pressed, shaken out, and covered up for the night. After further rolling, drying in the sun, and careful manipulation on two succeeding days, and all useless twigs and sticks having been eliminated, the twigs are sorted according to length and tied into bundles of three descriptions—short, medium, and long. "Chur" consists of pieces of the compressed flowerheads accidentally broken off in packing, together with fragments of resin, and it is on this form that the excise tariff imposes the highest duty, because in that state the drug is almost free from inert matter.

In contrast with the care and patience with which the drug is treated at Naogaon, may be given a description of the process of treading at Ahmednagar, Bombay. The preparation is much the same, but the treading-floor is usually prepared like an ordinary Indian threshing-floor with clay and cow-dung. The ganja is spread in squares of 15 or 20 feet wide, and about 6 inches thick, and a line of eight or ten men and women dance upon it to the music of a tom-tom. Treading begins at the outer edge of the heap, and is continued in a spiral until the centre is approached, when the men fall out one by one as the space grows smaller. They follow close on one another, dancing sideways in the leader's footsteps, and the music of the tom-tom keeps them at it.

Charas, which is used for smoking, is only collected in the Himalayas, but we may note here the methods adopted. The Bhutias of Nepal walk through the crop or jungle clothed in leather or with leather leggings on, to which the resin adheres, and from which it is scraped. In other places it is obtained by simply rubbing the young flowering tops between the hands, and in some of the native States by men walking to and fro among the plants clad only in a loincloth and their bodies smeared with oil.

Deterioration takes place in Indian hemp on keeping, which doubtless largely accounts for the contrasts in physiological activity in galenical preparations of the drug. The common belief in Lower Bengal is that ganja which has been kept for a year has lost its power, and ganja two years old is considered to be worthless, a standard of physiological activity which experiments have proved to be practically justified. Surgeon-Major Prain, Superintendent of the Royal Botanic Gardens, Calcutta, in his most recent communication to the Government embodying his researches on the storage of the drug, has proved that "by careful, 'close storage' (in a deal box with perforated sides) it is possible to preserve, even for three or four seasons, a good deal of the narcotic power of flat ganja, out that stored with the greatest care it seems by the time it is three and a half years old not to possess more than one-fourth the power of fresh ganja." It is believed, however, that this deterioration does not under ordinary conditions take place so rapidly in temperate climates as in that of Bengal. The drug, it was also proved, should not be stored in tins.

Of the pharmacy of Indian hemp there is little to be said until physiological standardization becomes a feature of our national pharmacopoeia. No drug demands this more than does cannabis indica, and none presents so much uncertainty in the amount of extractive it will yield to the pharmacist, or in the activity that the extractive will present to the prescriber. Nothing could be more haphazard than the B. P. formula for extractum cannabis indicæ, to "exhaust by percolation and evaporate the percolate to the consistence of a soft extract." But it is difficult to better it, according to present B. P. pharmacological standards. That august volume is not strictly correct in stating that "the leaves and bracts bear external oleo-resin glands." The narcotic principle of hemp is not an oil or a resin, nor is it an oleo-resin. All that Dr Prain could make of it last year was that it appeared to be "a substance that oxidizes into an ordinary resin as it ages." (Chemist and Druggist.

THE RETAIL PHARMACIST AND HIS SHOW WINDOWS.*

BY R. S. VITT, ST. LOUIS.

How many of my esteemed fellow members here assembled have taken notice of the show windows of the various retail drug stores?

I dare say each one of you has, and what is more, each one has his private opinion of some of them.

Strange, but true, we see some windows always looking the same. The same patent medicine boxes, dye cases, chewing gum signs, or some such are taken out each time the glasses are cleaned and always put right back again. This may be the result of several causes; for instance, some druggists leave the attention of windows entirely with the apprentice, who is constantly trying to break the record of getting through in the shortest time. He cares little, and seldom succeeds, in making them attractive. Again, the boy who really wants to make a display that necessitates a small expense has not at his command the money.

Every druggist should look after or superintend his windows personally, and I can speak from experience that the neighborhood will soon notice whether the windows are always the same or not.

Now, what do show windows indicate? What are they for? Your windows introduce you to your customers. Is it the kind of introduction you would have? Does it vouch for the dignity and character of your establishment?

You are very careful how you address a new customer, but your windows address him first, and more forcibly than your words.

Let your show windows be like eye-glasses made to properly fit you. Through the one you see the world, through the other the world sees you.

How many druggists do not look distrustfully upon this idea of making bright show, and feel that such action is lowering their professional dignity. Never need dignity be sacrificed; on the contrary, unless your window displays are prepared with a scrupulous regard for dignity (as expressed by good taste), you will derive little benefit therefrom. Dignity always; but not overdignity.

In all business, as a rule men can employ any honest method to make money. To a druggist, none is of greater value than his window displays, when well and tastefully prepared; they will stimulate his general trade as a tonic stimulates appetite. It will bring new customers to his store, and be discussed by the whole neighborhood. There are things to be avoided and things to be carefully provided.

It is very difficult to give a set of rules to be followed in making window displays. However, I will make a few suggestions, which, I hope, may be useful to some.

Before beginning to arrange your windows have them thoroughly cleaned inside and outside.

Devote the entire window to one article only, thus you place emphasis on this one thing that you arouse intense interest.

Choose carefully the article to be displayed. If you can, use local events to illustrate.

Introduce mechanical movement whenever possible; it adds double attraction.

Be ingenious. Study effects. Use your brains and hands to execute.

Avoid every indication of bad taste. Observe proportion, color, grouping and general harmony. Use color freely, but with good judgment.

Use plain signs, never use slang phrases. Be very careful to employ only modest and appropriate expressions.

Do not leave the same display in a window too long; change every week, or, at least, every two weeks.

Much might be added to this, but I believe that every druggist who does take an interest in his windows must carefully compare his surroundings and conditions, and be guided thereby in the displays he makes.

Many druggists seem to find it difficult to choose suitable goods to display. How often do we not see an entire window devoted to some patent medicine with a card announcing price at almost cost.

Can such a window bring satisfactory results? No. Patent medicines are not suitable for any druggist's window, and I hope the time is not far distant when they will not be given such prominent places as by some druggists to-day.

* Read before the Missouri Pharmaceutical Association. (W. D.)

(Special to the Era.)

PARIS PHARMACISTS PREPARE FOR 1900.

Paris, Aug. 10, 1898.

Before the Summer vacation scattered their ranks, a "general assembly" of Parisian professors and leading pharmacists met at the School of Pharmacy to elect a Committee of Organization for the Congress of 1900.

M. Bourquelot, as chairman of the Paris Society of Pharmacy, presided.

M. Petit, who had been selected as president for the 1900 Congress, having notified his intention to decline the honor, the choice of the meeting fell upon M. Planchon, Director of the Paris School of Pharmacy, who was elected (nem. con.) as chairman of the Organizing Committee for 1900. M. Petit and Professor Dupuy, of Toulouse, were voted vice-presidents, and M. Bourquelot, secretary. As this latter post is likely to be a busy one, it was decided that four assistant secretaries should be elected. The meeting named M. Viaud, of Nantes, and M. Desvignes, of Paris, the two vacancies will be filled later on. MM. Labelonye and Leroy are to be treasurers.

The General Committee

is to include all the professors at the Paris School of Pharmacy, and delegates from provincial schools; some army and navy pharmacists, the chief pharmacists of each Parisian hospital, the officials of the Paris Society of Pharmacy, and the members of the Codex Committee. All these may be classed as the professional and scientific element. The business side of pharmacy will be represented by the Council of the General Association of French Pharmacists, the officials of the Paris Syndicate, and the society now known as the "General Syndicate," while MM. Boulicaud, Gamel and Loisy will sit on the committee as delegates from the South.

The Four Sections.

of the Congress will be devoted to (1) Professional Interests; (2) Galenical Pharmacy; (3) Chemical Pharmacy, and (4) Materia Medica and Pharmacognosy.

M. Desvignes wanted to add a Section for Analysis, but it was pointed out that the Chemical Congress would deal with this matter. So, after authorizing the treasurer to temporarily disburse what money was necessary from the coffers of the Paris Syndicate (for a Government grant seems hardly to be hoped for) the meeting dispersed.

Many Other Congresses

Interesting pharmacists will be held in Paris in 1900; in fact, the congresses are to be one of the features of the exposition, and a special Congress Hall is to be built (close by the Alma Bridge). A "Superior Committee," presided over by the Minister of Commerce, is charged with the general organization, the congresses being grouped in sections, like the exposition itself. Professor Troost, the distinguished chemist, is President of Section IV. (Physical and Chemical Sciences), with M. Violle as Vice-Chairman; while in Section VI. (Medical and Pharmaceutical Science), Dr. Lannelongue is Chairman, and M. Planchon (Director of the Paris School of Pharmacy) Vice-Chairman.

The Medical Congress may possibly include a section of Pharmacy, and several leading Parisian pharmacists are taking a part in the organization of a Congress of Therapeutics and Materia Medica, similar to the 1889 gathering; while the Congress of Hygiene may have some interesting sections.

Dr. Archambaud and others have put forward the idea of a Medico-Pharmaceutical Congress, where doctors and pharmacists would meet on an equal footing and discuss how laws should be framed to respect the rights of each profession. But the Paris medical body looks coldly on the idea, and it is hardly likely to be carried out successfully.

The Congress of Applied and Analytical Chemistry has already met in Paris (1896), and will probably be a still more important and numerous gathering in 1900. M. Moissan, who has just been at the Vienna Chemistry Congress, is to be the leading organizer.

Other Functions

will be the inauguration of at least two statues.

The Pelletier-Caventou memorial is to be erected close by the School of Pharmacy, and unveiled during the

Pharmacy Congress, so that foreign subscribers will be able to assist at the ceremony. It will consist of two large bronze figures of the savants in question, dressed in their professors' robes. Sculptor Lormier, to whom the work has been entrusted, may be relied upon for something striking and artistic. The inauguration of Lavoisier's statue at the Madeleine will probably take place during the Chemistry Congress.

PHARMACY.

AIROFORM is identical with airol. These are trade-names for bismuth oxy-gallate. (Ph. Post.)

PYROGALLOL DI-ACETATE is a white powder, sparingly soluble in cold water, readily on addition of alkali. It is slightly toxic.

NAPHTHOFORMIN is prepared from alpha-or beta-naphthol and formin. It is to be used as an antiseptic in dermatology. (Ap. Ztg.)

SILVER PHOSPHATE IN GONORRHEA—The primary phosphate of silver has been used successfully as an injection in solutions containing 1 part in 2,000 to 4,000. (Ap. Ztg.)

HEADACHE PILLS: Quinine valerianate 1.0 Gm. (15 grains); caffeine citrate 0.5 Gm. (5 grains); extract cannabis 0.1 Gm. (1 1-5 grain), to make ten pills. Dose, 2 or 3 pills daily. (Ph. Post.)

EUDERNOL (nicotine salicylate) has been used in skin diseases, in form of ointment. The salt occurs in colorless, six-sided plates melting at 117.5° C. It contains 54 per cent. of nicotine. (Ap. Ztg.)

UROTROPIN EFFERVESCENT SALT, as prepared by Dr. Sandow, contains 20 per cent. of urotropin, and is used in the same manner as piperazin effervescent salt for uric acid diathesis. (Ph. Post.)

BETULINAR is a solution bearing the following formula on the label: Solution of salicyl-menthol-betulin 11 parts, boroglycerin 19 parts, tincture of birch 20 parts, aromatic birch water 50 parts. (Ap. Ztg.)

GUACAMPHOL is a camphoric ester of guaiacol, which crystallizes in white needles and is free from odor and taste. It is proposed as a remedy for diarrhoea and night sweats in tuberculosis. (Ph. Post.)

GALLOFORMIN is prepared from gallic acid and formin (hexamethylene tetramine). It occurs in the form of hard, strongly refracting crystals. It is intended for internal and external use. (Ph. Post.)

HÆMOL MERCURIC IODIDE, is, according to Kobert and Rille, best given in combination with opium, to prevent diarrhoea, stomach disturbances and the pain during swallowing, which are sometimes caused by the compound. (Ph. Post.)

ERYTHROL IN DYSPEPSIA—Erythrol, a double iodide of bismuth and cinchonine, is proposed by Robin for those forms of dyspepsia which are accompanied by butyric fermentation. After every meal 0.01 to 0.05 gm. (1-7 to 5-7 grain), may be taken with 0.1 to 0.2 Gm. (1½ to 3 grains) of magnesia. (L'Union Ph.)

COMBINATION OF CASEIN AND GLYCEROPHOSPHATES—A dilute aqueous solution of sodium or other glycerophosphate is warmed with casein at 30° to 40° C. with stirring, the mixture filtered after twelve hours contact and the filtrate evaporated to dryness at 50° to 52° in a vacuum. (Ap. Ztg.)

MENTHOL INHALATIONS are recommended by Jusseret for acute headache. A mixture of 5 parts of menthol and 2 parts of rectified oil of turpentine is dissolved in 100 parts of alcohol, a teaspoonful of the solution added to a cupful of hot water, and the vapors inhaled through the nose several minutes. The treatment is to be repeated every hour until relieved.

BROMOFORM-RUM consists of bromoform, 1.2 parts; chloroform, 0.8 part, and rum, 120 parts. This mixture is intended for children, and is given in the following doses: Under 2 years, 0.05 to 0.1 Gm. ($\frac{1}{4}$ to $\frac{1}{2}$ grain); 2 to 4 years, 0.1 to 0.15 Gm. ($\frac{1}{2}$ to 2 grains); 4 to 8 years, 0.15 to 0.3 Gm. (2 to 4 grains). (Ph. Post.).

CHIONE GLABRA is a plant found in the Windward Islands, where it is called *Violetta*. The root is said to have tonic properties, and is used as an aphrodisiac. The root bark yielded 1.5 per cent. of a pale yellow volatile oil. Alcohol dissolves 25 per cent. of the drug, the extract containing substances resembling tannin and saponin. (Ph. Post.).

NEUROLÉNA LOBATA.—The leaves of this plant, which are known in the West Indies as "Herbe a pique," are used as substitute for quinine, and are said to be particularly valuable in dysentery. They yielded 0.1 per cent. of a non-crystallizable alkaloid of extremely bitter taste, readily soluble in acids and precipitated by ammonia. (Ph. Post.).

ERGOTINOL (Liquor ammonii ergotini) is a new, stable preparation of ergot, of prompt action. It is given subcutaneously in doses of 1 cc., equivalent to 0.5 Gm. of ergot. For the pain accompanying the administration, minute doses of cocaine or morphine are recommended. The results have been encouraging. (Ph. Post.).

HYDROGEN DIOXIDE AS ANTIDOTE FOR HYDROCYANIC ACID has been practically demonstrated as effective. It is used in 10 volume strength for subcutaneous injection, applied every four minutes at different parts of the body. At the same time the stomach is washed out with a 2 per cent. solution. Hydrogen dioxide and hydrocyanic acid form oxamide, a harmless compound. (Ap. Ztg.).

FERRIC CITRATE FOR SUBCUTANEOUS TREATMENT.—Dr. Birgelen recommends 10 per cent. aqueous solutions of ferric citrate or ammoniated ferric citrate for cases where internal treatment is unsuccessful. The latter salt is most particularly recommended. The solutions must be sterilized, as they have a tendency towards becoming moldy. In some cases swellings with slightly raised temperature are caused by the injections. (Ap. Ztg.).

SODIUM BICARBONATE AS STIMULANT FOR THE STOMACH SECRETIONS.—It is recommended by Montegomery (Ph. Hdsch.) to take the salt before meals, as it then exerts a distinct action on the secretion of the gastric membranes. To obtain the best effects, it must be given about an hour before meals. The stimulant effect is noticeable after one hour, and is strongest 1 to 3 hours to three and one-half hours. The dose is 0.5 to 2.0 Gm. (8 to 30 grains). Larger doses neutralize the acidity of the gastric fluids and thus vitiate the effect.

META-CRESOL-CINNAMIC ESTER is a new compound intended for the treatment of tuberculosis. The preparation is as follows: 25 parts of meta-cresol and 35 parts of cinnamic acid, dissolved in toluol or other indifferent solvent, are heated under a reflux condenser with 20 or 25 parts of phosphorus oxy-chloride at 110° to 120° C., until the evolution of acid is ended. After cooling, the liquid is separated from a reddish, resinous mass, the solvent distilled off, and the residue crystallized from alcohol. The product melts at 65° C., dissolves in most organic solvents, but is insoluble in water. (Südd. Ap. Ztg.).

A NUTRITIVE PREPARATION FROM FENUGREEK SEEDS.—The seeds are crushed, treated with boiling ether or similar solvent (benzin, chloroform, etc.). To remove the oil, to which the repulsive odor of the seeds is due. They are then treated with diluted alcohol or any other good solvent for bitter principles and dried. The treatment may also be reversed, i. e., alcohol may be used first and ether afterward. The result is a food product, rich in albumen and free from starch. (Ap. Ztg.).

CONDENSATION PRODUCT OF TANNIN AND CHLORAL.—When chloral hydrate and tannin are brought together at a moderate heat, in presence of a strong acid, they combine, with elimination of water. The product of the reaction is a gray-brown, amorphous, fine powder, which is sparingly soluble in cold water, more soluble in warm water. The aqueous solution gives an olive-green coloration on the addition of ferric chloride, but is not affected by potassium cyanide. The compound is soluble in alcohol, but is insoluble in ether, chloroform, benzol and acetic ether. It has been found valuable in dermatology. (Ap. Ztg.).

SOLUBLE COMPOUND OF SILVER AND PROTEIDS.—When a moderately concentrated solution of peptone is mixed with a 10 per cent. solution of silver nitrate, a precipitate is formed, which is collected, washed, and, while still moist, placed into a hot 50 per cent. solution of protalbumose. On digesting this mixture on the waterbath, the peptone-silver precipitate soon goes into solution. This solution is evaporated to dryness in a vacuum, at a low temperature. The residue is a brown powder, easily soluble in water, which holds the silver in such strong combination that it can be detected only after destruction of the compound. (Südd. Ap. Ztg.).

PIPERIDINE DERIVATIVES.—Methods for preparing salts and other derivatives of piperidine have recently been patented. The tartrate is prepared by adding piperidine to a cold saturated solution of tartaric acid in molecular proportions. The recrystallized product melts at 136° to 137° C. The succinate is obtained by heating together 2 equivalents of piperidine and 1 of succinic acid on the waterbath. After recrystallization, the salt melts at 142° to 143° C. Piperidine-piperidyl-carbonate is obtained as follows: Piperidine, either in the pure state or dissolved in acetone or similar solvent, is subjected to the action of carbonic acid gas. The new product separates in crystalline form. Its melting point is 79 to 80° C. (Ap. Ztg.).

ARTIFICIAL ALBUMEN.—On the closing day of the International Congress of Applied Chemistry, an interesting paper was read by Dr. Leo Lilienfeld on the synthesis of albuminous substances. By means of the condensation of phenol and amido-acetic acid with phosphorus-oxychloride, the lecturer has succeeded in producing pepton, a substance which, it had hitherto been believed, could be obtained only from organic substances. In order to dispel any doubt as to the possibility of thus making artificial albumen, the lecturer carried out the entire process in the presence of the assembled chemists, and then demonstrated the identity of artificial and natural albumen by means of reactions. The process is extremely simple, and though it may be some time before artificial albumen can be made in the laboratory as cheaply as the natural article, in the form of meat, etc., the relative cost may ultimately be reversed. It is said that Professors Ludwig and Mauthner, of Vienna University, regard this discovery as important and one reflecting great credit on the investigator. The latter prints out, however, that, although the artificial body has the same chemical reactions and percentage composition as the natural product, it remains to be seen whether it will have the same alimentary effect. He mentions glycocol as being used in the synthesis, and points out that this costs £12 per kilogramme at present. The notice which this paper has attracted eclipsed that caused by one from Professor Buchner, of Tübingen, who gave the results of experiments in fermentation. It appears from the reports available at the time of writing this note that Professor Buchner "rubbed quartz sand into fresh brewer's yeast, and by this means lacerated all

the protecting skins of the yeast cells, and released the juice inside them. Out of the mass thus obtained he squeezed the fluid with the help of a hydraulic press of 500 atmospheres, and the result was half a pound of juice from a pound of yeast. The fluid was strained until quite clear, so that there could not be a single cell in it. Sugar dissolved in this juice changed immediately to alcohol and carbonic acid. The Professor during his lecture made the experiment, which fully succeeded, to the surprise of all the specialists present. It must be noted that Liebig and Berthelot many years ago expressed views on fermentation which were discredited, and which have now been confirmed by these experiments. All the modern theories on fermentation which seemed irrefutable, are overthrown by Professor Buchner's discovery. He found that it is perfectly easy to produce alcohol with the aid of a certain fungus, instead of using yeast. The process is much cheaper and quite as safe.—Br. and Col. Druggist.

THE BRAZILIAN PROCESS OF "SMOKING" RUBBER. Bd. of Trade Jour., July, 1898. (Jour. Soc. Chem. Ind.,—H. M. Consul at Para states that "the juice or milk of the Hevea brasiliensis may be caused to coagulate by various means. By the addition of a solution of alum, sodium chloride, or various other salts, or by simply allowing the milk to stand exposed to the air for twenty-four hours, or by artificial evaporation, the watery portion may be separated from the solid residue known to commerce as India rubber or caoutchouc. To produce, however, a substance having that consistency and elasticity which is desirable, it is of the first importance that this coagulation should take place in such a way that as little water as possible remains imprisoned in the mass. When the milk is allowed to coagulate by simply standing in contact with the air, a considerable amount of water remains in the mass; the rubber is flabby, inelastic and deteriorates rapidly. It is classed together with scraps and debris as "seramby," and fetches but a low price. When alum is used, the result is better. In the province of Matto Grosso, the milk is always treated with that reagent, and the rubber fetches but 5d. or 4d. per pound less than the finest Para rubber. The best rubber, known as Para fine, is produced, however, by rapidly evaporating the juice in the smoke produced by burning the nuts of the Urucury palm (*Attalea excelsa*). This is effected by throwing a small quantity of the nuts on a small wood fire, and the smoke pours out through a hole at the top of the dome. A piece of wood, sometimes cut to the shape of a rough spoon or paddle, is dipped into the milk and then held in the smoke until the viscous liquid has dried, leaving a layer of rubber on the stick. The stick is then dipped again into the liquid, and the process repeated until, layer by layer, a large pellet of rubber is built up. The exact action of the smoke has not yet been satisfactorily explained. It is probably due, however, to the acid (pyroligneous) present in the smoke. All the apparatus employed may be seen in the Kew Museum. But there is no doubt that the milk thus treated yields a very elastic, and, at the same time, firm rubber that is free from all tendency to flabbiness, and does not lose weight when stored. The smoke of an ordinary wood fire is found to produce what is known as "wet rubber," that loses from 5 per cent. to 10 per cent. in weight whilst in the hold on the way to Europe. A considerable amount of rubber is, however, probably prepared by this means in localities where the Urucury palm is scarce. The method of smoking, though very primitive, enables a man to prepare as much as 10 to 15 kilos of rubber in one hour. The good effects produced by the smoke of the Urucury nuts are probably due, in part, to the fact that the smoke is a dry smoke; but it seems probable that there is also some chemical reagent at work, the nature of which has not yet been ascertained. A machine, designed on the principles of a centrifugal cream separator, to separate the watery portion of the milk, has been tried, but without good results at present. A feasible method would be to dissolve the rubber in some liquid that will not mix with water. Carbon bisulphide, for instance, if it could be sufficiently cheaply produced, might revolutionize the present somewhat primitive system.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Laxative Quinine Tablets.

(C. M. R.) We cannot give the formula for the proprietary preparation.

Carbolineum Avenarius.

(J. G. Z.) Carbolineum Avenarius is a proprietary preparation recommended for use in preserving woods from decay, dry rot, etc., by application as a paint. Dr. Hayden M. Baker, chemist in the laboratory attached to the appraiser's department at this port, analyzed it some years ago and found it to be a wood tar oil, of the sp. gr. 1.1255 at 15.5° C., and "the product of the destructive distillation of wood, certain of its characteristic constituents (particularly the terpene hydrocarbons) being wood tar derivatives not found in coal tar."

Alcohol in Liquid Malt Extracts.

(Subscriber.) We do not know that all of the liquid malt extracts on the market are non-alcoholic. Most of them do contain a small percentage of alcohol. Emanuel, in a reply to a query, communicated the results of an examination of six samples of different malt extracts to the Pennsylvania Pharmaceutical Association (1896), in which he gives the lowest percentage of alcohol as 1.75, and the highest 6. An infusion of malt, examined at the same time, contained no alcohol, while a sample of beer was found to contain 3.5 per cent. We do not know what particular processes the various manufacturers employ to keep their respective products from fermenting.

Gold Chloride and Alkaloids.

(H. W. W.) submits the following prescription:

- | | |
|---------------------------------------|-----------|
| (1) Sodio-aureic chloride | 12 grains |
| Ammonium chloride | 6 grains |
| Strychnine nitrate | 1 grain |
| Atropine | 1 grain |
| Fluid extract cinchona compound | 3 ounces |
| Fluid extract coca | 1 dram |
| Glycerine | 1 ounce |
| Water | 1 ounce |

Mix. Teaspoonful every two hours.

- | | |
|---------------------------------|------------|
| (2) Sodio-aureic chloride | 1-10 grain |
| Strychnine nitrate | 1-40 grain |

Mix. Inject hypodermically every two hours.

These prescriptions are said to constitute part of the "Keeley Cure," and as such, they have been published in a number of journals. Both prescriptions are incompatible. Chloride of gold precipitates strychnine, atropine and the alkaloids of cinchona. Chloride of gold is also easily reduced by the organic matter in the fluid extracts, though this reaction may be somewhat retarded in the presence of glycerine. We cannot recommend any particular treatment for the cure of drunkenness. This duty belongs to the physician. It may be noted, however, that in most of the so-called bichloride drunkenness cures, the gold is entirely left out as a remedy in the treatment. We do not answer queries by mail.

Cholera Mixtures.

(C. M. R.) The National Formulary gives five formulas under the above title. Here are some others:

- | | |
|---------------------------------------|-------------|
| (1) Tannic acid | 1 dram |
| Chloric ether | 2 drams |
| Dilute sulphuric acid | 1 ounce |
| Tincture ginger | 3 drams |
| Peppermint water enough to make | 8 ounces |
| Dose, tw. tablespoonfuls. | |
| (2) Aromatic sulphuric acid | 1/2 ounce |
| Spirit ether | 1/2 ounce |
| Comp. tincture chloroform comp. | 1 ounce |
| Peppermint | 1 1/2 ounce |
| Spirit peppermint | 3 drams |
| Extract haematoxylon | 4 drams |
| Camphor water to | 12 ounces |

This formula for choleric diarrhoea is ascribed to Sir Andrew Clark, the initial dose being on ounce and then one-half ounce every two, three or four hours afterwards, according to the nature of the case. The medicine must be preceded by a full dose of castor oil, and given only if the diarrhoea continues after the action of the oil has ceased.

Hager gives this formula under the title "tincture anti-cholera, or Dr. Bister's 'Cholera Drops'."

Oil anise,	
Oil juniper berries,	
Oil cajuput, of each,	3 parts
Spirit ether,	15 parts
Tincture cinnamon,	30 parts
Haller's acid elixir (N. F.),	1.25 parts
Mix. Dose, 50 drops.	

Depilatory: Superfluous Hair.

(F. C.) The principal agents employed for the removal of superfluous hair are caustics, electricity, and the knife in minor surgical operation. Probably the best results, as a whole, are obtained from the use of the electric needle, and there are in nearly all large cities people who make a specialty of this form of treatment. For large blemishes, like hairy moles, etc., the advice of a competent physician should be sought, for frequently dangerous hemorrhages ensue from attempts to remove these blemishes. A very efficient caustic paste is the following, which is said to eat or dissolve the hair itself, but does not destroy the hair glands, and must be applied as frequently as the growth of the hair renders necessary:

Powdered quicklime	1 ounce
Barium sulphide	1 ounce
Starch	1 ounce

The powder is first moistened with a little water and made into a paste and then applied. It acts in a few minutes, and is then removed by scraping with a paper knife or smaller blunt instrument. The skin is well washed with water and an emollient applied. Barium sulphide used in preparations of this character should be freshly prepared.

Here are some other formulas:

(1) Barium sulphide	1 ounce
Zinc oxide	1 ounce
Starch	2 ounces

Make into a paste with water at the time of using, spread over the part required, and remove at the end of five or ten minutes.

(2) Sodium sulphide	6 drams
Powdered quicklime	3 ounces
Starch	2 ounces
Powdered orris	1 ounce

A depilatory long used in the Orient consists of one part orpiment and six parts of lime slaked to a powder. The ingredients are intimately mixed by passing them through a sieve. For use, it is made into a paste with water, similarly to that given above, and applied. It is very energetic, and its use is not advised.

Characteristics of Different Vinegars.

(Acetum.) The characteristics of the different vinegars may be thus enumerated: Cider vinegar should have a yellowish-brown color, and a cider-like odor. Evaporated to dryness on a water bath it leaves a dark brown residue, having a taste of burnt apples. The amount of extract is from 1.5 to 5 per cent, depending on the age of the sample, and method of manufacture. Cider vinegar made by the old process contains malic acid, and on the addition of acetate of lead gives a heavy yellowish precipitate of malate of lead. The ash from cider vinegar contains considerable quantities of alkaline phosphate. The residue from wine vinegar contains the salts found in wine. It is distinguished from other vinegars by containing cream of tartar. Spirit vinegar made from dilute alcohol should leave only a very small residue; if caramel has been added to color it the residue will be of a dark black brown, and leave no ash on burning. Beer vinegar is of a yellowish color and has an odor of sour beer. It contains as much as 6 per cent, of solids on evaporation. Both malt and beer vinegars have a higher specific gravity than wine vinegar (1.021 to 1.025), and contain dissolved dextrin, maltose soluble albuminoids and similar constituents of malt extracts. Blythe classifies the adulteration of vinegar as follows: 1. water

2. mineral acids usually sulphuric rarely hydrochloric or nitric; 3. metallic adulterations, or, more properly, impurities as they are introduced from the apparatus; 4. pyrogenous acid; 5. various organic substances, such as coloring agents, apium. The most common adulteration is said to be the substitution or mixture of acetic acid, obtained by the destructive distillation of wood, for that produced by the acetous fermentation of a weak alcoholic liquor. Substitutions of this kind can best be judged by a comparison of the flavor with a standard sample. The analysis of a sample of vinegar consists in a determination of the specific gravity, the amount of acid present and total solids. The specific gravity may be taken with a Westphal balance in the usual manner. To determine the acidity 20 cc. are measured into a beaker, 100 cc. of water and a few drops of phenolphthalein solution are added, and the acid titrated with a normal alkali solution. In the presence of sulphuric acid, it is necessary to distil a measured quantity of the sample almost to dryness and titrate the distillate, it being assumed that 50 per cent. of the total acetic acid present passes over. The solids are found by evaporating 20 cc. to dryness at 100° C. Considerable information on this subject may be found in either of the dispensatories. The numbers commercially applied to vinegars in England as "18, 20 or 24 vinegar," are quoted by Proctor as having been said to originally denote the number of pence per gallon charged by the maker, and, though they have lost that meaning, they are still in use as indicating the grades of quality.

White Liniment.

(J. D.) The adjective "white" has been applied to several liniments well known to pharmacists. Thus, the synonymous title, "linimentum album," is given in the National Formulary under acetic acid liniment, and the name has been quite generally given to the ammonia type of liniments represented by the "linimentum ammoniac" of the Pharmacopoeia. Considerable criticism has been made of the last named formula, the objectionable feature of the process being the use of cottonseed oil, which does not seem well adapted for the preparation, separation into two distinct layers invariably occurring in the resulting mixture. Caspari says a much more satisfactory liniment may be obtained if the cottonseed oil be replaced in part—15 or 20 per cent.—by olive oil, and particularly common olive oil, which usually contains some free fatty acids. Lard oil has also been recommended as forming a white smooth mixture.

The following formula is given

Olive oil	8 fl. ounces
Lard oil	2 fl. ounces
Ammonia water	6 fl. ounces
Oil of thyme	2 fl. dram

The Era Formulary gives the following under the title "white oil liniment."

Yolk of eggs	12
Soft soap	6 ounces
Turpentine	20 ounces
Stronger water of ammonia	5 ounces
Acetic acid	4 ounces
Camphor	6 ounces
Alcohol	8 ounces
Oil amber	4 ounces
Water, enough to make	4 pints

Rub the soap gradually with 10 ounces of water to form a smooth jelly; add the alcohol with the camphor dissolved in it mix the turpentine and the oil of amber add gradually to the mixture, stirring the while and adding emulsification by the occasional addition of a little water. Then add the ammonia. Now transfer to a larger bottle add gradually the acetic acid, diluted with a pint or more of water; add the eggs, one by one, well shaking all the time and finally make up to 40 ounces with water. The acetic acid may be omitted, and if this be done, a perfect liniment is obtained. The following formula has been published for

Genuine White Oil Liniment.

Ammonium carbonate	10 parts
Camphor	20 parts
Oil turpentine	20 parts
Oil origanum	20 parts
Castile soap	10 parts
Water to make	200 parts

NEW YORK WEEKLY PRICES CURRENT.

Prices here quoted are for quantities and varieties usually purchased by the retail druggist. Quantity purchases may usually be made at lower prices.

ADVANCED.—Silver Nitrate, Poppy Seed, Bay Rum, Cocaine, Saigon Cassia, Oil Lemon-grass, Fennel Seed, Bismuth Preparations, Atr-pine Sulphate.

DE-LINED.—Italian Aeneid Seed.

Drugs and Chemicals.

Acacia, ex select white.	lb.	55	70
1st select.	lb.	62	68
2d select, powdered.	lb.	62	68
3d select.	lb.	62	68
4th select.	lb.	62	68
Fine Granulated 1st.	lb.	69	65
Sifted sorts.	lb.	62	68
Acetic Acid, No. 1, 1.040.	lb.	08	08
U. S. P. 36 p. c., 1.047.	lb.	08	10
Quail, abs.	lb.	38	38
Arsenous, pure.	oz.	08	10
Benzoic, English, true.	oz.	12	14
German.	lb.	12	15
Carbolic, cryst., lb. bot.	lb.	14	16
Carbolic, pure.	lb.	35	40
Carbolic, cryst., lb. bot.	lb.	27	30
5 lb. cans.	lb.	24	26
U. S. P. 36 p. c., 1.047.	lb.	24	26
Chromic.	oz.	07	14
C. P.	oz.	25	32
Citric, cryst.	lb.	75	85
Gallie.	lb.	75	85
Hydrocyanic.	oz.	07	14
Lactic, conc.	lb.	85	100
Murph. coml., 20 deg. carbonyl.	lb.	04	05
120 lb. (2c).	lb.	10	14
Nitric (Hydrochloric).	lb.	07	08
120 lb. (5c).	lb.	12	16
C. P.	lb.	30	35
Oxalic.	lb.	12	16
Phosphoric, diluted.	lb.	12	16
U. S. P., 1880.	lb.	12	16
Syrup.	lb.	35	40
Gla. (lb. bot. 64).	lb.	25	30
Pyrogallie.	lb.	55	57
Salicylic, bulk.	lb.	60	65
1 lb.	lb.	73	75
1/2 lb.	lb.	72	75
Succinic (lb. bot. 1.60).	oz.	12	15
Sulphuric, coml., 66 deg. carbonyl.	lb.	05	08
C. P.	lb.	10	14
Sulphur, U. S. P. sol.	lb.	90	150
Tannic, lb. car.	lb.	34	38
Tartaric, cryst.	lb.	20	25
Thymic (Thymol).	lb.	30	35
Tri-chlorate.	lb.	100	120
Acetic, leaves, Eng. lb.	lb.	18	20
German.	lb.	18	20
Alcohol, Absolute.	gal.	45	50
Grain, 25 p. c.	gal.	24	26
Methylic (Wood).	gal.	90	100
Aliphatic, Clean.	lb.	14	18
Almonds, Bitter, shelled.	lb.	32	38
Sweet, Jordan.	lb.	30	35
Valencia, shelled.	lb.	35	38
Almond, white, sweet.	lb.	35	38
Sweet, white.	lb.	38	42
Aloes, Barbadoes, True.	lb.	12	15
Cape.	lb.	12	15
Powdered.	lb.	16	18
Socotrine.	lb.	35	38
Powdered.	lb.	40	45
Aloin (lb. 60-70).	oz.	08	10
Althaea, Marsh.	lb.	40	45
Leaves.	lb.	25	30
Root, select cut.	lb.	14	18
Ground, bls. or less.	lb.	02	04
Lump, bls. or less.	lb.	02	04
Powdered, bls. or less.	lb.	02	04
Aluminum, Acetate.	oz.	15	17
Aceto-tartrate.	oz.	20	24
Chloride, pure.	oz.	15	18
Sulphate, Coml.	lb.	40	45
Purif.	lb.	40	45
Alum.	oz.	40	45
Amergis, black.	lb.	40	45
Gray.	lb.	45	50
American Centaury, herb, pressed.	lb.	30	35
American Hellebore Root (Veratrum Viride).	lb.	20	24
Ground, 1 lb. bot.	lb.	03	04
47.	lb.	06	07
Conc.	lb.	07	08
American T. Root.	lb.	11	14
Ammonium Benzoate.	oz.	11	14
Bichromate (lb. 85).	oz.	10	13
Bromide, lb. bots.	lb.	60	65

Ammonium Carbonate, Jars.	lb.	11	14
Resublimed.	lb.	30	33
Iodide (lb. bot. 3.90).	oz.	33	35
Muriate, Lumpa.	lb.	12	15
Pure.	lb.	08	10
Mur., Powdered.	lb.	17	20
Nitrate, Gran.	lb.	20	25
Phosphate.	lb.	70	75
Salicylate.	oz.	16	20
Sulphate.	lb.	25	27
Pure, resub.	lb.	25	27
Sulphocyanate, pur.	oz.	08	12
Valerianate, cryst. (lb. 2.90).	oz.	23	27
Amyl Nitrite, 1 oz. v.	oz.	17	22
Amylene Hydrate.	oz.	40	45
Nitric.	lb.	20	25
Angustura Bark.	lb.	20	25
Aeneid, Italian.	lb.	10	15
Star.	lb.	35	40
Antimony Chloride Sol. (butyr.)	lb.	18	20
Antidote, white.	lb.	50	60
Sulphuret, black, coml.	lb.	06	08
Pure.	lb.	10	14
And Potassium Tart. (Tartar Emetic).	lb.	38	40
Antisone.	oz.	2	3
Antipyrin.	oz.	30	35
Apocynum.	oz.	40	45
Aspirin.	lb.	35	40
As. v.	lb.	35	40
Crystals, 1/2 oz. v.	lb.	60	65
Arnica.	lb.	14	18
Arnica Flowers.	lb.	14	18
Powdered.	lb.	14	18
Arnica Root.	lb.	55	60
St. Vincent.	lb.	16	20
Arsenic Bromide.	oz.	30	35
White.	lb.	08	10
Iodide.	oz.	25	30
White, Lump.	lb.	08	10
Asafetida, Good, fair.	lb.	22	27
Powdered.	lb.	40	45
Atr-pine, sulph., 3 lbs.	oz.	57	60
Balm Peru, True.	lb.	23	25
To p. c.	lb.	42	45
Barium, Carb. precip.	lb.	40	45
Chloride, C. P. Cryst.	lb.	30	32
Nitrate.	lb.	05	08
Sulphate, pure.	lb.	35	40
Sulphide, pure.	lb.	60	65
Bassberry.	lb.	10	12
Bay Rum, Imported.	gal.	25	27
Beans, Calabar.	lb.	30	35
1 lb. bot.	lb.	165	185
Vanilla, Long.	lb.	13	16
Beberine, Pure.	oz.	190	200
Belladonna Leaves.	lb.	20	25
1 lb. bot.	lb.	20	25
Benzoic, Sumatra, select.	lb.	25	30
Benzoic, Sumatra.	lb.	80	85
Benzoic, Benzol.	oz.	120	130
Birch Bark.	lb.	210	225
Bismuth & Ammon. Cit.	lb.	150	165
Oxychloride.	lb.	230	240
Tryp. c. c.	lb.	165	185
Subcarbonate.	lb.	160	170
Subgallate.	lb.	150	165
Subnitrate.	lb.	140	150
Tannate.	oz.	18	20
Black Alder Bark.	lb.	10	12
Colic Root.	lb.	20	25
Haw.	lb.	10	12
Willow, Root.	lb.	10	12
Pilewort.	lb.	14	18
Hood Root (Sanguinaria).	lb.	14	18
Blue Cohosh, Root.	lb.	16	18
Mass.	lb.	40	42
Utramarine.	lb.	12	15
Vitrolin, Herb. (Cop. Sulph.)	lb.	20	25
Horn, Armenian.	lb.	08	12
Bone, Cuttlefish.	lb.	20	25
Bonest Leaves and Tops.	lb.	06	08
Borage, Flowers.	lb.	06	08
Borage, Leaves.	lb.	06	08
Powdered.	lb.	06	11
Bromoform.	oz.	25	27
Burck Root.	lb.	15	20
Ruchu Leaves, Long.	lb.	30	35
Short.	lb.	25	30
Rukus, black.	lb.	15	18
Berries.	lb.	55	65
Balm of Gilead.	lb.	15	20
Burck Root.	lb.	15	20
Seed.	lb.	15	20
Butternut Bark.	lb.	45	50
Cane Root.	lb.	45	50
Cefrine, pure (lb. 7.8).	oz.	30	34
Citrate (lbs. 3.40).	oz.	30	34
Hydrobromate, Gra. Ed.	lb.	50	55
Hydrochloride (true).	oz.	60	65
Caffeine Salicylate.	oz.	70	75
Sodium Benzoate.	oz.	70	75
Calamine.	lb.	10	11
Calamus.	lb.	40	45
split.	lb.	40	45
Calcium Bromide, oz. v.	oz.	07	08
Chloride, C. P., cryst.	lb.	30	35
Hypophosphite.	lb.	20	25
Iodide.	oz.	40	47
Lactophosphate Sol.	oz.	20	25
Phosphoric, precip.	lb.	50	60
Sulphate, Precip. pure.	lb.	50	60
Sulphite, Neutral.	lb.	18	20
Calendula Flowers.	lb.	65	70
Calomel. (See Merc. Chloride).	lb.	35	38
Camphor, Refined.	lb.	40	44
Compressed, ozs.	lb.	10	14
Monobromate.	oz.	125	150
Canada Balsam, True.	gal.	2	4
Canada Snake Root.	lb.	30	33
Canary Seed.	lb.	02	06
Canella Bark.	lb.	12	15
Cantharides, Sifted.	lb.	60	65
Capicum, African, Red.	lb.	18	22
Caramel (gallon 1.00).	lb.	15	18
Caraway Seed.	lb.	08	12
Carbon Bisulphide.	lb.	12	14
Cardamoms, Black.	lb.	125	150
Caroline, No. 40.	oz.	25	35
Cassara Amara.	lb.	100	110
Sagrad.	lb.	12	16
Cassia Bark.	lb.	12	16
Cassia Pistula.	lb.	10	15
Castor Oil.	lb.	10	15
Catechu, Powdered.	lb.	25	28
Cefry Seed.	lb.	10	14
Cerium Oxalate (lb. 60).	lb.	10	14
Chalk, French, Cut.	lb.	10	14
Powdered, White.	lb.	06	08
Precipitate, English.	lb.	06	08
Prepared, drops.	lb.	04	08
White.	lb.	003	03
Chamomile Flowers, Ger. 1808.	lb.	30	35
Roman.	lb.	30	35
Charcoal, Animal.	lb.	10	12
Willow, Powdered.	lb.	13	15
Chestnut, Leaves.	lb.	15	20
Chicle.	lb.	25	30
China Root.	lb.	25	30
Chloral Hydrate, Cryst.	lb.	145	160
Chloroform.	lb.	15	18
Cinchona Bark, Pale.	lb.	30	35
Red, quill.	lb.	35	40
Yellow.	lb.	35	40
Cinchonidine, Alk. pure.	oz.	24	30
Salicylate.	oz.	30	35
Sulphate.	oz.	16	27
Cinchona (Cinchona).	oz.	22	25
Sulphate.	oz.	15	17
Cinnamon, Cassia.	lb.	18	22
Cevlon.	lb.	32	37
Salt n. 65.	lb.	58	65
Civet.	ozs.	500	600
Cloves.	lb.	18	22
Powdered, pure.	lb.	18	22
Cobalt, Powdered (Fly Poison).	lb.	14	18
Cocaine.	lb.	30	35
Muriate, Cryst.	oz.	300	325
Coca Leaves.	lb.	35	40
Cochineal, Honduras.	lb.	35	40
Powdered.	lb.	40	45
Cocoa Butter (see Cacao).	oz.	500	525
Codine, Alk. (5 oz.).	oz.	425	475
Phosphate.	oz.	425	475
Colchicum Root.	lb.	425	475
Colic Root.	lb.	18	20
Seed, German.	lb.	18	20
Colloid.	lb.	80	85
Canthar.	lb.	18	22
Flexible.	lb.	90	95
Colocynthis Apple, Select.	lb.	55	60
Croton.	lb.	15	20
Columbo Root.	lb.	30	35
Conifery.	lb.	18	22
Condurango, Bark, True.	lb.	35	40
Confection Rose, U. S. P.	lb.	40	45
Conium, U. S. P.	lb.	12	15
Conium Leaves.	lb.	12	15
Seed.	lb.	20	22
Copals.	lb.	50	55
Copper Sulphate.	lb.	60	65
Arsenite.	oz.	20	25
Carbonate.	lb.	30	35
Chloride.	lb.	50	55
Sulphate (Blue Vit.).	lb.	04	08
Purified.	lb.	08	12
Coppers. (See Iron Sulph.)	lb.	20	25
Coriander Seed.	lb.	08	12
Corrosive Sublimite. (See Mercury Chloride).	lb.	13	14
Cotton Bark Root.	lb.	13	14
Cramp Bark.	lb.	16	20
Cranesbill.	lb.	20	25
Cream Tartar, Powdered.	lb.	20	25
Cresote (Beech Wood).	lb.	85	90
Carbonate (Cresote).	oz.	40	45
White (of Tea).	lb.	40	45
Cube Berries, sifted.	lb.	15	20
Cubeb.	lb.	17	20
Cumin.	lb.	15	20
Cumin Seed.	lb.	15	20

Oil Tansy, Pure.....lb.	1.50	1.75	Pomegranate, Fruit.....lb.	12	18	Quinine Sulph, 100-os. cans.....oz.	20	22
Tar.....gal.	30	40	Bark of Root, Thick.....lb.	25	30	5-os. cans.....oz.	24	26
Thyme, Comm'l.....lb.	30	40	Poplar, Bark, Ground.....lb.	18	22	1-oz. vials.....oz.	27	29
White (Perfumers).....lb.	45	1.00	Powdered.....lb.	35	40	Tannate.....oz.	30	35
White (Perfumers).....lb.	1.40	1.50	Poppy Leaves.....lb.	30	35	Valerianate.....oz.	32	35
Turpentine, Rectified.....lb.	35	40	Seed, Blue (Maw).....lb.	15	18	Rape Seed, English.....oz.	35	38
Wine, Ethereal.....lb.	3.50	4.00	White.....lb.	15	20	German.....lb.	05	07
Wintergreen.....lb.	1.25	1.40	Potassa, Cryst. Com.....lb.	35	38	Raspberry Leaves.....lb.	11	14
Wormseed, Baltimore.....lb.	2.75	3.00	Pure, White, Stick.....lb.	35	40	Red Oak Bark.....lb.	02	04
Wormwood, Best.....lb.	3.50	3.75	C. P. by Ale.....lb.	75	85	Resin, Common.....lb.	10	12
Yang Yang, True.....oz.	8.00	7.00	S. U. S. F. (Liq.....lb.	12	15	Resorcin.....lb.	10	12
Oilment, Mercurial, 1/2 Merc.....lb.	47	50	(tassar).....lb.	24	25	Rhatany, Crushed.....lb.	20	25
Oleoclein Capelcum.....lb.	35	40	Potassium Acetate.....lb.	14	15	Rhubarb, Canton.....lb.	45	75
Cubeb.....oz.	25	30	Bicarbonate.....lb.	14	15	Powdered, Extra.....lb.	1.15	1.25
Male Fern.....oz.	18	22	Potassa, Cryst. Com.....lb.	13	15	Rochelle Salt, (See Sod. & Pot. Tartrate).....lb.		
Oilbanon, Tears, Select.....lb.	15	22	Bichromate.....lb.	13	15	Rose Leaves, Pale.....lb.		30
Opium, Natural.....lb.	3.85	4.00	Binoxalate (Sul Acetocella).....lb.	20	25	Red.....lb.		75
U. S. P. Powdered.....lb.	4.75	5.50	Carbonate, Refined.....lb.	12	14	Rosemary Leaves.....lb.	12	15
Orange Flowers.....lb.	1.00	1.25	C. P.....lb.	50	55	Rue, Herb.....lb.		30
Peel, Carmoia.....lb.	15	18	Chlorate.....lb.	13	15	Saccharine, 1 to 500.....% oz.		1.00
Orrie, Florentine.....lb.	20	25	Powdered.....lb.	14	15	Saffron, Amer. (Safflower).....lb.	25	30
Select Finger.....lb.	85	100	Purified, Gran.....lb.	25	30	Spanish, Valencia.....lb.	11.50	12.00
Orthoform, Oza.....lb.	1.60	1.80	Chloride, C. P.....lb.	35	40	Sage, Leaves, Italian.....lb.	10	12
Fansy Herb.....lb.	1.25	1.50	Chromate, Comm'l.....lb.	45	47	Sallcin (Oza. 27).....lb.	2.50	3.00
Papain.....oz.	12	15	Citrate.....lb.	45	45	Sallpyrin.....oz.	1.25	1.50
Paraldehyde (lb. bottles).....lb.	1.65	1.75	Cyanide, C. P.....lb.	45	45	Sallol (Oza. 30).....lb.	3.50	4.00
Parafra Brava Root.....lb.	20	25	Hypo-sulphite.....lb.	1.00	1.10	Salphen.....oz.		1.00
Patheola Flowers.....lb.	60	70	Iodide.....lb.	2.40	2.65	Sandarac Gum, clean.....lb.	25	30
Peel, Carmoia.....lb.	15	18	Nitrate.....lb.	10	12	Sanguinaria Nitrate.....gr.	07	10
Pearl Ash (see Potassium Carbonate).....lb.	50	60	Oxalate, Neutral.....lb.	25	27	Santonin.....lb.	3.00	3.25
Penroyal Leaves, ess.....lb.		20	Permanganate, Pure.....lb.	26	30	Sarsaparilla Root, Hond. Cut.....lb.	42	47
Peony Flowers.....lb.	50	60	Phosphate, C. P.....lb.	80	85	Mexican, cut.....lb.	18	20
Pepper, Black, Clean Sifted.....lb.	14	18	Prussiate, Red.....lb.	50	55	Sassafras, Fitt.....oz.	10	15
White.....lb.	22	25	Yellow.....lb.	25	30	Savin Tops, Pressed.....lb.	25	25
Peppermint Herb, Ger.....lb.	50	55	Saliclate.....oz.	17	20	Scammony, Resin.....oz.	30	40
Leaves, Pressed (Oza.).....lb.		24	Silicate.....lb.	12	15	Virgin, True, 70/80%.....lb.	7.50	8.00
Petroleum, U. S. P.....lb.	07	09	Sulphate, Powdered.....lb.	12	18	Aleppo.....lb.	3.00	3.50
Oil lbs.).....lb.		15	C. P.....lb.	40	45	Scopolamine Hydrobromate.....gr.	13	15
White.....lb.		15	Sulphocyanate.....oz.	15	18	Sagea Root.....lb.	35	40
Phenacetin (25 oza. 55).....oz.		1.00	Sulphuret.....lb.	18	18	Seidlitz Mixture.....lb.	16	22
Phenocoll Hydrochlor (25 gm v.).....oz.		1.50	Tartate, Pow'd. (Sol. Tart.).....lb.	50	55	Senna, Alex.....lb.	25	35
Phosphorus, Amorphous (lb. cns.).....lb.	1.00	1.65	Powder, Aromatic.....lb.	1.25	1.65	Sifting.....lb.	12	15
Phytostigmine, Salicyl.....gr.	07	08	Hoyer U. S. P.....lb.	1.00	1.10	Tinneyville, Select.....lb.	15	25
Phosphorus, Amorphous (lb. cns.).....lb.	1.00	1.65	Licorice, Comp.....lb.	25	30	Silver Nitrate, Cryst. (lb. 7.00).....oz.	50	53
Phycostigmine, Salicyl.....gr.	07	08	Prickly Ash Bark.....lb.	15	20	Fused, Cones.....oz.	65	70
Phosphorus, Amorphous (lb. cns.).....lb.	1.00	1.65	Silicate.....lb.	12	15	Stick (Lunar Caulst.).....oz.	45	50
Phycostigmine, Salicyl.....gr.	07	08	Protargol (1/2 oz. & 1/2).....oz.		1.25	Oxide.....oz.		2.25
Phosphorus, Amorphous (lb. cns.).....lb.	1.00	1.65	Pulsatilla Herb.....lb.	18	22	Skunk Cabbage, Root.....lb.	20	25
Phycostigmine, Salicyl.....gr.	07	08	Purpura Seed.....lb.	15	18	Soap, Castile, Green (box).....lb.	10	12
Phosphorus, Amorphous (lb. cns.).....lb.	1.00	1.65	Quackecko, Bark.....lb.	20	25	Mottled, Genuine.....lb.	06	06 1/2
Phycostigmine, Salicyl.....gr.	07	08	Quindine, Pure.....lb.		90	White, Conti's (cases).....lb.	104	11
Phosphorus, Amorphous (lb. cns.).....lb.	1.00	1.65	Sulphate.....lb.		78	Powdered.....lb.	32	36
Phycostigmine, Salicyl.....gr.	07	08	Quinine Alkaloid, Pure.....lb.	55	58	Levin's (cs bars).....lb.	102	11
Phosphorus, Amorphous (lb. cns.).....lb.	1.00	1.65	Bisulphate.....lb.	26	31	(12-1-02).....cs.	3.50	3.75
Phycostigmine, Salicyl.....gr.	07	08	Hydrobromate.....oz.	45	48	Powdered (lb. 10).....lb.		30
Phosphorus, Amorphous (lb. cns.).....lb.	1.00	1.65	Hydrochlorate.....lb.	50	55	Eng. Blue, Mottled, box 112 lb.....lb.	5.00	5.50
Phycostigmine, Salicyl.....gr.	07	08						

At Baltimore, a large city, offering a pleasant winter home and economical living

THE MARYLAND COLLEGE OF PHARMACY

is located. It teaches the Pharmacy pharmacists should know. Each professor has published a text book upon his branch in which the lectures can be easily followed. Full Laboratory Courses, Ample Apparatus, Commodious Building.

SEND FOR CATALOGUE.

HENRY P. HYNSON, Secretary, - - - 423 N. Charles St., Baltimore, Md.

BROOKLYN COLLEGE OF PHARMACY

STILL ADVANCING

Increased popularity.
More students last year than ever before.
Limit of accommodations almost reached.
Still greater advantages offered for '98-'99.
Chemical, Pharmacognosy and Pharmaceutical Labora-
tories thoroughly fitted up for good, practical work.

Botanical Garden at Hicksville.
The Regular Lectures and Post-Graduate Course com-
mence Sept. 26, 1898. Total fees to Juniors, \$70; to Seniors,
\$75; Post-Graduate, \$65.

For prospectus and particulars address

WM. L. HARLOE, Clerk of the College, 329 Franklin Ave., BROOKLYN.

ST. LOUIS COLLEGE OF PHARMACY.

Thirty-Third Annual Session Will Open Monday, October 3rd, 1898, and Continue for Six Months.

The spacious College Building contains THREE LARGE LECTURE HALLS, thus furnishing each professor time and space to properly
range on his lecture table all the apparatus required to experimentally demonstrate before the students the subject of his lectures.
It contains THREE LARGE LABORATORIES, provided with the most complete working apparatus. An abundance of light and air,
with plenty of elbow room, contribute to make the laboratories in these Laboratories pleasant as well as profitable.
The courses of instruction are as complete as any in the country.

FACULTY AND INSTRUCTORS: Otto A. Wall, Ph. G.; James M. Good, Ph. G.; Francis Hemm, Ph. G.; H. M. Whelpley, Ph.
G.; F. R. M. S.; Gustavus Hirsch, A. M.; L. D.; John C. Falk, Ph. G.; William K. Thart, Ph. G.; G. C. Hirsch, Ph. G.; Oscar H.
Hirsch, Ph. G.

For additional information address the Dean of the Faculty:

JAMES M. GOOD, PH. G., 2348 Olive Street, ST. LOUIS, MO.

Cincinnati College of Pharmacy.

SCHOLASTIC YEAR FROM SEPTEMBER TO JUNE.

Graded Courses by Lectures,
Class Drill and Laboratory Work. Three Laboratories and a Dispensing Department

FOUR DEGREES. Progressive. Complete. Thorough.

Address, C. FENNEL, Actuary, Cincinnati, O.

Soap-Tree Bark, Cut.	lb.	12	.14
Do. " "	lb.	03	.04
Purified, Fused	lb.	33	.38
Sodium Acetate	lb.	22	.25
Arsenate, Pure	lb.	76	.70
Arsenite	lb.	15	.15
Benzoate	lb.	2.60	.00
True Benzol Acid	lb.	03	.05
Bicarbonate	lb.	16	.20
C. P.	lb.	35	.45
Calciphosphate, Eng.	lb.	58	.63
Carbonate (Sal Soda)	lb.	01	.03
Dried, U. S. P.	lb.	30	.30
Eucalypti	lb.	02	.04
C. P., Cryst., U. S. P.	lb.	25	.35
Chlorate	lb.	30	.35
Chloride, C. P.	lb.	50	.55
Citrate	lb.	12	.10
Hypophosphite	lb.	1.25	.10
Hypophosphite	lb.	04	.08
Iodide	lb.	3.20	.30
Nitrate, purified	lb.	10	.10
C. P., Cryst.	lb.	1.00	.12
Peroxide (Dioxide)	lb.	10	.11
Phosphate, Cryst.	lb.	10	.11
Pure Gran.	lb.	24	.40
P. Dried	lb.	18	.23
And Pot. Tart. (Rochelle) Salt.	lb.	06	.06
Salicylate, White	lb.	01	.04
From O. Winters	lb.	01	.04
Sulphate (S. Glauber).	lb.	10	.15
Pure, Cryst.	lb.	10	.15
Dry	lb.	25	.30
Sulphide	lb.	40	.48
Sulphite, Cryst.	lb.	08	.10
Sulphur	lb.	70	.75
Sulphuric Acid	lb.	40	.48
Spartine Sulphate	lb.	1/2	.02
Spearmin Leaves	lb.	20	.20
Spermaceti	lb.	25	.25
Stearic Acid	lb.	40	.50
Spirits Ammonia, U. S. P.	lb.	10	.10
Aromatic	lb.	10	.10
Umbelliferone	lb.	45	.60
Nitrous Ether	lb.	1.50	.15
Spruce, Gum, True	lb.	25	.30
Squill Vine, Herb.	lb.	08	.12
Squill Root	lb.	30	.35
Stavesacre Seed	lb.	12	.15
Stillingia Root	lb.	25	.35
Storax, liquid	lb.	12	.15
Stramonium Leaves	lb.	12	.15
Strontium Bromide	lb.	45	.60
Lacate	lb.	18	.22
Iodide	lb.	45	.50
Nitrate Dry	lb.	45	.50
Oxalate	lb.	14	.18
Salicylate	lb.	02	.14
Strophanthin, C. P., 5-gr. v.	each	1.00	.30
Strophanthin, 1-gr. v.	each	3.00	.00
Nitrate, 1/2-oz. v.	oz.	2.00	.00
Phosphate, 1/2-oz. v.	oz.	1.25	.10
Powdered, pure, 1/2-oz. v.	oz.	1.25	.10
Sulphate, 1/2-oz. v.	oz.	1.25	.10
Sugar, Milk	lb.	18	.15
Powdered	lb.	12	.15
Sulphonal	oz.	1.38	.00
Sulphur Flowers	lb.	04	.06
Lac. Precipitated	lb.	03	.06
Rolls	lb.	03	.06
Washed	lb.	10	.13
Summer Savory, Leaves	lb.	09	.13
Sundewer Seed	lb.	25	.30
Sweet Marjoram Leaves	lb.	25	.30
Syrup Buckhorn Berries, N. F.	lb.	80	.90
Hydroiodic Acid, U. S. P.	lb.	70	.100
Iron Iodide, U. S. P.	lb.	44	.47
Tag Alder Bark	lb.	00	.20
Talcum, Powdered	lb.	00	.04
Purified	lb.	13	.24
Tamarinds, Jars	lb.	10	.13
Tansy, Herb.	lb.	60	.60
Tan. Barbadoes	lb.	60	.60
N. Carolina, pints	dos.	75	.90
Tartar Emetic (see Antimony and Potassium Tartrate)	lb.	70	.80
Terbentine	lb.	70	.80
Terpin Hydrate	lb.	70	.80
Terpinol	lb.	88	.90
Thiol.	oz.	04	.04
Thyme, Herb, bulk	lb.	25	.35
Thymol (see Acids)	lb.	25	.35
Tin, Muricic, Cryst. pure.	lb.	20	.22
Solu, bats, 5-lb.	lb.	12	.15
Tolypirin	lb.	04	.04
Tranquacanth, Turb. No. 2	lb.	85	.85
No. 1	lb.	70	.80
White, Powdered, No. 1	lb.	90	.100
No. 2	lb.	70	.80
Traumaticin	oz.	20	.25
Tribromphenol	oz.	1.50	.00
Bismuth	oz.	1.50	.00
Trional	lb.	10	.13
Turmeric, Powdered	lb.	30	.40
Turpentine, Chian	lb.	20	.35
Venice	lb.	20	.35
White, clean picked	lb.	07	.10
Tutty, Prepared Imp. Oxide Zinc	lb.	60	.80
Trosin	lb.	1.35	.04
Urethane, C. P.	lb.	40	.50
Urotropin (4 ozs. and ozs.)	oz.	1.35	.04
Uva Ursi Leaf	lb.	10	.12
Veratrin Root	lb.	15	.35
Veratrin (Eletc Powder)	lb.	1.20	.00
Virginia Snake Root	lb.	35	.40
Water Ash, Eucalypti	lb.	25	.35
Water, Bark or Root	lb.	25	.35
Water Pepper, Herb.	lb.	30	.38

War, Bay	lb.	30	.35
Bees, Yellow	lb.	30	.35
Select	lb.	35	.40
Caruba, No. 1	lb.	35	.40
Japan	lb.	12	.16
White, sun-bleached	lb.	35	.40
White Ash Bark	lb.	18	.20
Oak Bark	lb.	15	.18
Pink Bark	lb.	15	.18
Willow Cherry Bark	lb.	12	.15
Wormwood, Levant	lb.	14	.18
Wormwood, Leaves, Blk.	lb.	15	.18
Xeroform	lb.	25	.30
Yerba Santa Leaves	lb.	15	.18
Zinc, C. P.	lb.	12	.15
Gran.	lb.	150	1.60
Metallic, C. P., Sticks	lb.	20	.22

Zinc, Acetate	lb.	22	.25
Benzoate	oz.	36	.40
Bromide	oz.	12	.15
Chloride	oz.	40	.45
Chloride, Fused	lb.	33	.38
Gran.	oz.	06	.08
Solution, Medicinal	lb.	18	.20
Hypophosphite	oz.	60	.65
Shirole, Fused	oz.	40	.45
Oxide, American	lb.	09	.12
Eng. Hubbard's	lb.	35	.50
Permanganate	oz.	90	.95
Phosphide	oz.	27	.30
Sulphate, Cryst.	lb.	03	.04
C. P.	lb.	17	.20
Valerianate	oz.	20	.25

Paints and Oils.

White Lead, Zinc, &c.			
Am. Dry White Lead	lb.	04	.05
Pure do. in oil	lb.	07	.08
English dn. in oil	lb.	08	.09
Litharge	lb.	05	.05
Orange Mineral, Am.	lb.	06	.07
Powdered, pure	lb.	04	.05
Zinc White, G. S.	lb.	09	.09
R. S.	lb.	10	.10

Ocher, French	100 lb.	1.50	1.75
Domestic	100 lb.	.70	.90
MISCELLANEOUS.			
Chalk	100 lb.	.40	.60
Fuller's Earth, bbls.	100 lb.	.90	1.00
Flags	100 lb.	.75	.90
Paris White, English	lb.	.4	.01
American	100 lb.	.65	.85
Dental	100 lb.	1.30	1.50
Pumice Stone, selected lump, bbls.	100 lb.	.04	.15
Powdered, pure	lb.	.01	.05
Putty, bulk	lb.	.01	.03
Bladders	lb.	.05	.05
Powdered, bbls.	lb.	.05	.05
Smalts Blue	100 lb.	.10	.12
Talc, American	100 lb.	.07	.10
French	100 lb.	.15	.15
Whiting, commercial	lb.	.60	.80
Gliders	lb.	.65	.85
Extra gliders	lb.	.65	.85

Colors in Oil.			
Black Coach	lb.	14	.15
Burnt Umber	lb.	10	.12
Calcined	lb.	10	.12
Chrome Green	lb.	08	.14
Dry Black	lb.	12	.14
Ivory Black	lb.	06	.12
Prussian Blue	lb.	13	.14
Raw Sienna	lb.	10	.12
Ultramarine Blue	lb.	10	.18
Vandyke Brown	lb.	10	.12

Dry Colors.			
BLACKS.			
Lamp, Commercial	lb.	08	.10
German town	lb.	12	.20
White	lb.	20	.30
BLUES.			
Prussian Blue	lb.	30	.31
Soluble Blue	lb.	08	.25
Ultramarine Blue	lb.	18	.35
BROWNS.			
Sienna, Italian, burnt and pow'd.	lb.	03	.04
Raw, powdered	lb.	04	.05
American burnt and powdered	lb.	01	.01
Spanish Brown	lb.	4	.01
Umber, Turkey, burnt & pow'd.	lb.	02	.03
Raw and powdered	lb.	01	.01
American burnt	lb.	01	.01
Raw	lb.	01	.01
Vandyke Brown	lb.	05	.07
GREENS.			
Chrome, chem. pure.	lb.	22	.28
Extra	lb.	12	.13
Superior	lb.	08	.11
Common	lb.	08	.08
Viridian Green	lb.	17	.21
REDS.			
Carmine, No. 40	lb.	22	.35
Indian Red, American	lb.	05	.10
Rose Pink, English	lb.	07	.09
American	lb.	08	.10
Venetian Red, Eng. prime	lb.	15	.17
American	lb.	16	.18
Vermilion	lb.	80	.90
Chinese	lb.	80	.90
American	lb.	54	.67
Artificial	lb.	19	.20
YELLOW.			
Chrome Yellow	lb.	10	.14

Oils, Turpentine, &c.			
Alcohol-Grain, Wood. (See Drug List).	gal.	10	.20
Benzine, 76 deg.	gal.	12	.15
Ground	lb.	15	.25
White	lb.	25	.30
Oil of Cedar	gal.	33	.34
Linseed, Raw	gal.	33	.34
Boiled	gal.	35	.35
Pearl, White	gal.	35	.35
Chole	gal.	80	.80
Yellow	gal.	45	.60
Poppo	gal.	18	.18
Rose	gal.	33	.34
Spirits Turpentine	bbl.	314	.33
Do	gal.	33	.34
Varnishes	lb.	08	.10
Asphaltum	lb.	40	.40
Copal	lb.	40	.40
Damar	lb.	28	.30
Shellac, A. C. Garnet	lb.	28	.30
Blackened	lb.	30	.35
Nagilac	lb.	25	.30
V. S. O.	lb.	30	.35
Varnishes.			
Asphaltum, Turps	gal.	50	.65
Benzine	gal.	30	.45
Copal, Ex. No. 1	gal.	95	1.10
No. 1	gal.	75	.90
T. & B.	gal.	80	.95
Coach, Ex. No. 1	gal.	95	1.10
No. 1	gal.	80	.95
No. 2	gal.	80	.95
No. 1	gal.	125	1.40
Flowing, Extra	gal.	195	2.10
Hard Oil	gal.	195	2.10
Dark	gal.	80	.95
White	gal.	125	1.40
Japan Turpentine	gal.	30	.40
Japan Benzine	gal.	30	.40
Oil Shellac	gal.	85	1.00
Shellac, orange	gal.	250	3.00
White	gal.	270	3.00

Window Glass.

82	Price per box of 50 feet. Discount on full boxes, 80 and 100 off from list price. Single or Double Strength.									
80										
78										
76										
74										
72										
70										
68										
66										
64										
62										
60										
58										
56										
54										
52										
50										
48										
46										
44										
42										
40										
38										
36										
34										
32										
30										
28										
26										
24										
22										
20										
18										
16										
14										
12										
10										
8										
6										
4										
2										
0										

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Ph.D.
Virgil Colenzy, A.M., Ph.D.
Wilbur G. Compher, A.M., Ph.D.
M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Fwell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heobner, Ph.M., Ph.G.
George B. Kauffman, B.Sc., Ph.D.
E. J. Kennedy, Ph.C.
Henry Kramer, Ph.C., Ph.D.
Edward Kromers, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.

CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years graded course of lectures for the Home Study of Pharmacy published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks from September to May. Tuition Fee \$8 per annum complete.

CONTRIBUTOR

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison
Oscar Oldberg, Ph.D.
George F. Payne, Ph.G., M.D.
Edgar L. Pat E. Ph.G.
T. D. Reed, M.D., C.M.
Edsel L. Rudiman, Ph.M., M.D.
Henry H. Rusty, M.D.
Samuel P. Sadler, Ph.D.
L. E. Sayre, B.S., Ph.M.
Wilbur L. Seville, Ph.G.
William S. S. Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Welling, Ph.G., Ph.D.

SENIOR COURSE. LECTURE No. 3.

Official Preparations.

LIQUORES. The Solutions.

The official Liquors are aqueous solutions of non-volatile substances. The distinctive feature which separates them from the official waters is the non-volatility of the dissolved substances.

The solutions are among the most active and important of official preparations. They are twenty-four in number, and mainly inorganic, the only exception to the latter statement being the radicals of the organic acids combined with the metallic bases.

It is common to divide the solutions into two groups, "simple" and "chemical," the latter term being applied to those whose manufacture is accompanied by chemical reaction. As the chemical reaction by means of which the dissolved substance is produced and its subsequent solution are two distinct processes, we do not see the appropriateness of the title "chemical solution." For this reason it is perhaps better to classify the solutions according to the nature of the dissolved substances. This not only separates the class into smaller and more easily remembered sub-divisions, but has the additional advantage of helping to fix in the mind the character of the several solutions, some of which are dangerously poisonous if improperly employed.

According to this plan, then, the Liquors are divided into six sub-classes, as follows:

1. Solutions Containing Arsenic.
2. Solutions Containing Iron Compounds.
3. Solutions Containing Salts of Heavy Metals.
4. Solutions Containing Alkaline Hydroxids.
5. Solutions Containing Salts of the Alkalies or an Alkaline Earth.
6. Solution containing a Free Element

1. SOLUTIONS CONTAINING ARSENIC.

Liquor Acidi Arsenosi. Solution of Arsenous Acid.

Liquor Arseni et Hydrogryri Iodidi. Solution of Arsenic and Mercuric Iodid.

Liquor Potassii Arsenitis. Solution of Potassium Arsenite.

Liquor Sodii Arsenatis. Solution of Sodium Arsenate.

These four solutions are alike in containing one per cent. each of the arsenical constituent, so that the dose of each preparation is substantially the same about two to five minims.

Solution of Arsenous Acid is made by boiling 10 Gm. of Arsenous Acid with 50 Cc. Diluted Hydrochloric Acid and Distilled Water until the Arsenic is dissolved filtering through paper, and making up to 1000 Cc.

Solution of Arsenic and Mercuric Iodid. or Donovan's Solution, is prepared by dissolving 10 Gm. each of the iodids of arsenic and mercury in sufficient distilled water to make 1000 Cc.

Solution of Potassium Arsenite. the well-known Fowler's Solution, is prepared by boiling together 10 Gm. each Arsenous Acid and Potassium Bicarbonate in distilled water until dissolved, adding 30 Cc. Compound Tincture of Lavender, and filtering.

The compound tincture of lavender is to give the solution a characteristic odor and taste, and lessen the danger of mistaking it for a non-poisonous preparation.

Solution of Sodium Arsenate is prepared by dissolving one gram of Sodium Arsenate, deprived of its water of crystallization by heat, in a sufficient quantity of distilled water to make 100 Cc.

2. SOLUTIONS CONTAINING IRON COMPOUNDS.

Liquor Ferri Chloridi. Solution of Ferric Chlorid.

Liquor Ferri Subsulphatis. Solution of Ferric Subsulphate.

Liquor Ferri Tersulphatis. Solution of Ferric Sulphate.

Liquor Ferri Acetatis. Solution of Ferric Acetate.

Liquor Ferri Citratis. Solution of Ferric Citrate.

Liquor Ferri Nitriti. Solution of Ferric Nitrate.

Liquor Ferri et Ammonii Acetatis. Solution of Iron and Ammonium Acetate.

Solution of Ferric Chlorid is prepared by dissolving bright iron wire in hydrochloric acid,—



adding nitric acid to oxidize the ferrous salt to ferric,—



boiling to get rid of nitrogen acid and excess of nitric acid, adding water to make 1000 Cc., and filtering.

The principal use of this solution is in making the tincture of ferric chlorid.

Solutions of Ferric Subsulphate and Ferric Sulphate, or Tersulphate. are made by dissolving ferrous sulfate in water, adding sulfuric acid, and nitric acid to oxidize the ferrous salt to ferric, boiling to get rid of the excess of nitric acid and nitric acid, diluting to the proper strength and filtering.

The solution of subsulfate differs from the other in containing a basic salt, i. e., a salt having a larger proportion of base to acid than the other. It is used as a styptic, and is the solution to be dispensed on prescriptions for *Persulfate of Iron*.

The Solutions of Acetate, Citrate and Nitrate are prepared by precipitating ferric hydroxid from solution of ferric sulfate with ammonia water, washing the precipitated hydroxid free from ammonium salts, dissolving it in the acetic, citric or nitric acid, and making up to the proper strength by addition of distilled water.

Solution of Iron and Ammonium Acetate, or Basham's Mixture, is a compound solution prepared by mixing tincture of ferric chlorid, diluted acetic acid, ammonium acetate, aromatic elixir, glycerin and water.

It is unstable and should be freshly prepared when wanted.

3. SOLUTIONS CONTAINING SALTS OF HEAVY METALS.

Liquor Hydrargyri Nitrat. Solution of Mercuric Nitrate.
Liquor Plumbi Subacetatis. Solution of Lead Subacetate.
Liquor Plumbi Subacetatis Dilutus. Diluted Solution Lead Subacetate.

Liquor Zinci Chloridi. Solution of Zinc Chloride.

The first and last of these are strongly caustic, and antiseptic. The second and third are astringent. All are poisonous, and are never used internally.

Solution of Mercuric Nitrate is prepared by dissolving 40 Gm. Red Mercuric Oxide in 45 Gm. Nitric Acid diluted with 15 Gm. Water. It is a colorless, heavy liquid, Specific Gravity 2.100, very corrosive, and is used as a caustic. It contains about 60 per cent. of mercuric nitrate, and about 11 per cent. of free nitric acid.

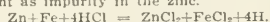
Solution of Lead Subacetate, formerly known as Goulard's Extract, is prepared by dissolving 170 Gm. Lead Acetate in distilled water, adding 100 Gm. Lead Oxide, boiling for half an hour and diluting to 1000 Gm. The lead oxide dissolves, converting the normal acetate to basic acetate. It contains about 25 per cent. of basic salt, the exact composition of which is somewhat indefinite. On account of the great affinity for carbon dioxide, the solution must be preserved in well stoppered bottles.

This preparation is sedative and astringent, and is applied externally to inflamed surfaces.

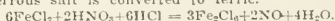
Diluted Solution of Subacetate of Lead, or Lead Water, is made by diluting 30 Cc. of the preceding solution with sufficient recently boiled Distilled Water to make 1,000 Cc. The solution is usually opalescent from the presence of traces of carbonic acid in the distilled water. As the preparation has frequently been taken by mistake for lime water, it should always be dispensed with a poison label.

Solution of Zinc Chloride is prepared by dissolving granulated zinc in hydrochloric acid, adding nitric acid, evaporating to dryness and fusing. The fused mass is then dissolved in water. Precipitated Zinc Carbonate added, and the mixture allowed to stand for 24 hours, after which the clear solution is decanted or siphoned off.

When the zinc dissolves in hydrochloric acid, zinc chloride is produced, together with ferrous chloride from iron present as impurity in the zinc.



By adding nitric acid and evaporating to dryness, the ferrous salt is converted to ferric.



When the fused salt is redissolved and zinc carbonate added, the iron is precipitated as the insoluble hydroxide, while zinc chloride remains in solution.

The solution is colorless, odorless, and has an acid, astringent and sweetish taste. It contains about 50 per cent. of zinc chloride, and has a specific gravity of 1.535.

It is used principally as an antiseptic and disinfectant, being a frequent ingredient of embalming fluids used by undertakers. A cheaper and less pure article than the official liquid is sold as *Burnett's Disinfecting Fluid*.

4. SOLUTIONS CONTAINING ALKALINE HYDROXIDS.

Liquor Calcis. Solution of Lime.

Liquor Potassae. Solution of Potassa.

Liquor Sodae. Solution of Soda.

Solution of Lime, or Lime Water, as it is commonly called, is a saturated solution of Calcium Hydroxide, containing at ordinary temperatures about 0.17 per cent. of the compound.

It is made by shaking lime with distilled water, agitating with a further quantity of water, allowing to subside and then pouring off and rejecting the clear solution. The residue of calcium hydroxide is then agitated with a second quantity of distilled water, and when clear is ready for use. The liquid is not to be filtered, but is allowed to stand over the undissolved lime.

The purpose of the first washing is to dissolve and remove soluble compounds of the alkalies generally present in lime.

As calcium hydroxide is less soluble in hot than in cold water, it results that lime water will become

cloudy when heated. It also rapidly absorbs dioxide from the air, which occasions a precipitation of calcium carbonate.

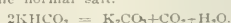
Lime water is a mild antacid, and is administered in doses of 60 to 120 Cc.

Solution of Potassa is a five per cent. solution of Potassium Hydrate, made by decomposing a boiling solution of potassium carbonate by means of boiling milk of lime, allowing the precipitated calcium carbonate to subside, and decanting or siphoning off the clear liquid.

The reaction between the potassium carbonate and the calcium hydroxide may be represented as follows:



The solution of potassium carbonate is prepared from the bicarbonate, which on boiling evolves carbon dioxide and forms the normal salt.



Solution of Soda is prepared in the same way as solution of potassa, substituting sodium carbonate for potassium carbonate.



For each of the preceding solutions the Pharmacopoeia gives an alternate formula, permitting the simple solution of the proper amount, (50 Gm.) of potassium or sodium hydroxide of official strength in sufficient distilled water to make 1000 Gm. of solution.

As the hydroxides of the market are rarely of official strength, they must be assayed before using, and on this account it is generally more convenient to prepare the solutions by decomposing the carbonates.

Both solutions are acid and caustic. Undiluted, they are corrosive poisons. The proper antidotes are mild acids, as vinegar and lemon juice, and bland fixed oils, as lard, olive, cotton seed, etc.

When given internally they must be largely diluted. They are antacid, and are given in doses of 0.5 to 1.2 Cc.

5. SOLUTIONS OF SALTS OF THE ALKALIES OR AN ALKALINE EARTH.

Liquor Ammonii Acetatis. Solution of Ammonium Acetate.

Liquor Potassii Citrat. Solution of Potassium Citrate.

Liquor Soda Chlorat. Solution of Chlorinated Soda.

Liquor Sodii Silicatis. Solution of Sodium Silicate.

Liquor Magnesii Citrat. Solution of Magnesium Citrate.

The solutions of this sub-class contain such salts of alkalies or of alkaline earths as have not been included in the preceding sub-classes. Beyond this fact, they have not many features in common, either in properties or in composition.

Solution of Ammonium Acetate, also known as Spirit of Mindererus, is made by saturating diluted acetic acid with ammonium carbonate, selecting the translucent portions of the latter. The salt should be in small pieces and added gradually.

As this preparation should be freshly made when dispensed, the Pharmacopoeia provides an alternative formula, by which the ammonium carbonate is kept in solution and mixed with diluted acetic acid at the time of dispensing.

Solution of ammonium acetate contains about 7 per cent. of the salt, $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$, with some free carbon dioxide and acetic acid. It is diuretic and diaphoretic. The dose is 15 Cc.

Solution of Magnesium Citrate is made by neutralizing a solution of Citric Acid with Magnesium Carbonate, filtering into a strong bottle containing Syrup of Citric Acid, filling to the neck with water, dropping in some crystals of Potassium Bicarbonate, corking tightly and tying down the cork.

Refrigerant and aperient. The entire bottle is usually given, better in divided portions.

Solution of Potassium Citrate is made by mixing solutions of Potassium Bicarbonate and Citric Acid at the moment of dispensing. It contains about 9 per cent. of the salt, $\text{K}_2\text{C}_6\text{H}_5\text{O}_7$, with carbon dioxide and citric acid.

This preparation is intended as a substitute for the old Neutral Mixture, made by saturating lemon juice with potassium bicarbonate.

The solution is diaphoretic and refrigerant in doses of 2 to 4 Cc.

Solution of Chlorinated Soda is made by mixing hot solutions of Sodium Carbonate and Chlorinated Lime allowing to clear by subsidence, decanting the supernatant liquid and filtering. The official solution contains 2.6 per cent. of available chlorine. It is used for disinfecting and bleaching purposes, and is also known as Labarraque's Solution.

Solution of Sodium Silicate, or Soluble Glass, is prepared by fusing together fine, White Sand, or Silicon Dioxide, and Sodium Carbonate, powdering the fused mass and lixiviating with hot water.

Usually seen as a thick, syrupy liquid, and employed

in surgery for giving the requisite stiffness to mechanical dressings.

6. SOLUTION CONTAINING A FREE ELEMENT.

Liquor Iodi Compositus. Compound Solution of Iodine.

Compound Solution of Iodine is made by dissolving 5 Gm. of Iodine and 10 Gm. Potassium Iodide in sufficient Distilled Water to make 100 Gm. Iodine is sparingly soluble in water, but freely soluble in solutions of potassium iodide.

This preparation is also known as Lugol's Solution. It is used as a reagent for alkaloids, and as a convenient mode of administering iodine internally. It is administered in 3 to 5 minims doses very largely diluted.

SENIOR COURSE, LECTURE NO. 4.

Pharmaceutical Latin.

BY PROF. WILBER G. COMPHER, A.M., PH.D.

THE FIRST DECLENSION.

Nouns of this declension are mainly of the feminine gender, and mark the cases by the following endings, called *case endings*:

	N.	G.	D.	Ac.	V.	Ab.
Singular:	a	æ	a	am	a	a
Plural:	æ	arum	is	as	æ	is

The case endings attached to the stem of the word, which is found by dropping the Genitive ending, form the inflection of the word, indicating its case and number. Take the word *aqua*. Supposing the student is unacquainted with the word, he will look in the vocabulary and will find the following forms: *Aqua, -æ*. These show the Nominative form *aqua*, and the genitive ending *æ*. Remembering from the table of genitive endings that the *æ* indicates the first declension, and consequently the stem of the word explained above will be *aqu*, he is prepared for the full declension of the word, which will be as follows:

	N.	G.	D.	Ac.	V.	Ab.
Singular:	aqua	aquæ	aquæ	aquam	aqua	aqua
Plural:	aquæ	aquarum	aquis	aquas	aquæ	aquis

Exercises.—In like manner decline: *Massa, lingua, jalapa, mistura, herba, gutta, farina, faba, drachma, cicuta*.

There are also a few nouns of this declension which have the following endings in the singular, while the plural is the same as in *aqua*.

	N. e.	Ac. en.
G. es.	V. e.	
D. e.	Ab. e.	

Alor is an example of this class.

In Latin, adjectives agree with their noun in gender, number and case, and are, accordingly, inflected like nouns of similar terminations in the first, second and third declensions.

The adjective *puro*, pure, when modifying a noun of the first declension will be declined like *aqua*. These two declined together will be as follows:

SINGULAR.

N. Aqua pura, pure water.
G. Aquæ puræ, of pure water.
D. Aquæ puræ, for pure water.
Ac. Aquam puram, pure water.
V. Aqua pura, O pure water.
Ab. Aqua pura, with or in pure water.

PLURAL.

N. Aquæ puræ, pure waters.
G. Aquarum purarum, of pure waters.
D. Aquis puris, for pure waters.
Ac. Aquas puras, pure waters.
V. Aquæ puræ, O pure waters.
Ab. Aquis puris, with or in pure waters.

Exercises.—Decline together, *cicuta alba, pilula amara, massa lina, tinctura flava, pilula pilula*.

Translate into the Latin the following sentences, remembering that the adjective follows the noun it modifies, and a transitive verb is placed last in a sentence, as, "The small girl has a small phial," would

be translated: "*Puella parva phialam parvam habet.*"

est=is, sunt=are, habet=has, habent=have.

- (1) The chalk is white.
- (2) The water is pure.
- (3) The pills are bitter.
- (4) The girl has a bitter aloë.
- (5) They have yellow tinctures.

The Latin has no words corresponding to *the, a or an*, and these words must be omitted in translating into Latin, and must be supplied in translating from the Latin into the English.

The Nominative singular of nouns of the second declension end in *er, ir, us* and *os*, for masculines, and *um* and *on* for neuter. The pharmacist has to do, however, with the nouns in *us* and *um*, there being only three or four ending in *on*.

The neuter constitute a very large class, and their endings should be carefully learned.

There are three nouns in *us* that belong to the fourth declension, while all others with this ending are of the second.

Masculine.		Neuter.	
Singular.	Plural.	Singular.	Plural.
N. <i>us.</i>	N. <i>i.</i>	N. <i>um.</i>	N. <i>a.</i>
G. <i>i.</i>	G. <i>orum.</i>	G. <i>i.</i>	G. <i>orum.</i>
D. <i>o.</i>	D. <i>is.</i>	D. <i>o.</i>	D. <i>is.</i>
Ac. <i>um.</i>	Ac. <i>os.</i>	Ac. <i>um.</i>	Ac. <i>a.</i>
V. <i>e.</i>	V. <i>i.</i>	V. <i>um.</i>	V. <i>a.</i>
Ab. <i>o.</i>	Ab. <i>is.</i>	Ab. <i>o.</i>	Ab. <i>is.</i>

From the above endings it will be seen that the only difference between the singular of the masculine and neuter is in the nominative and vocative singular cases, and in the nominative, accusative and vocative plural.

These endings should be carefully compared with each other, and with those of the first declension that there may be no mistaking the cases. The endings are attached to the stem of the word to form the declension in the same way that they were in the first declension.

The nouns *Ficus, fig*, and *Ferrum, iron*, are declined as follows:

Singular.	Plural.	Singular.	Plural.
N. <i>Fic-us.</i>	N. <i>Fic-i.</i>	N. <i>Ferr-um.</i>	G. <i>Ferr-orum.</i>
G. <i>Fic-i.</i>	G. <i>Fic-orum.</i>	G. <i>Ferr-i.</i>	N. <i>Ferr-a.</i>
D. <i>Fic-o.</i>	D. <i>Fic-is.</i>	D. <i>Ferr-o.</i>	G. <i>Ferr-orum.</i>
Ac. <i>Fic-um.</i>	Ac. <i>Fic-os.</i>	Ac. <i>Ferr-um.</i>	D. <i>Ferr-is.</i>
V. <i>Fic-e.</i>	V. <i>Fic-os.</i>	V. <i>Ferr-um.</i>	Ac. <i>Ferr-a.</i>
Ab. <i>Fic-o.</i>	Ab. <i>Fic-is.</i>	Ab. <i>Ferr-o.</i>	Ab. <i>Ferr-is.</i>

Those ending in *on*, have *on* in the nominative, accusative and vocative singular, and in the other cases are like *ferrum*.

Exercises.—Decline *calamus, crocus, humulus, phosphorus, rubus, syrnus, thymus, onisum, bariun, chlorum, iodidum, zincum* and *hormatoloxylon*.

We are now prepared for the full declension of the adjectives of the first and second declensions. This is done by using the endings of the first declension for the feminine of the adjective, the endings of the masculine and neuter of the second declension for the masculine and neuter of the adjective.

It must be remembered that in Latin an adjective agrees with its noun in gender, number and case, and hence must be inflected in the same manner.

But it must not be inferred that because an adjective has the endings of a noun of the second declension that

it can modify nouns of the second declension alone. It may modify a noun of any declension, providing it is made to agree with it in number, gender and case.

The adjective *purus* is thus declined:

Singular.		
Masculine.	Feminine.	Neuter.
N. Pur-us.	Pur-a.	Pur-um.
G. Pur-i.	Pur-æ.	Pur-i.
D. Pur-o.	Pur-æ.	Pur-o.
Ac. Pur-um.	Pur-am.	Pur-um.
V. Pur-e.	Pur-a.	Pur-um.
Ab. Pur-o.	Pur-a.	Pur-o.

Plural.		
Masculine.	Feminine.	Neuter.
N. Pur-i.	Pur-æ.	Pur-a.
G. Pur-orum.	Pur-arum.	Pur-orum.
D. Pur-is.	Pur-is.	Pur-is.
Ac. Pur-os.	Pur-as.	Pur-a.
V. Pur-is.	Pur-æ.	Pur-a.
Ab. Pur-is.	Pur-is.	Pur-is.

Exercise.—Translate and give the cases of the following: *Aqua pura, tinctura amara, amygdalum parvum, puctulam agrotum, plumbum purum, rhumet acet amarum, vinum purum est rubrum, indicus bonus est doctus.*

Translate into English.—The doctor mixes (miscet) the quinine. The medicine is brown. The yellow mixture is bitter. The small pills are white.

There is a number of adjectives of this declension whose nominative masculine has *er*, as *tener*, *ager*, *miser*, *niger*, *piger*, etc.

They are declined like *purus* in all other cases, except those ending in *ger*, as *niger*, *ager*. These drop the *e* between the *g* and *r*, when the ending is added.

Example—N. *Niger*, *nigra*, *nigrum*; G. *nigri*, *nigra*, *nigri*, etc.

The numeral *duo*, two, belongs to this declension, and is thus declined:

Masculine.	Feminine.	Neuter.
N. Duo.	Duæ.	Duo.
G. Duorum.	Duorum.	Duorum.
D. Duobus.	Duabus.	Duobus.
Ac. Duo.	Duæ.	Duo.
V. Duo.	Duæ.	Duo.
Ab. Duobus.	Duabus.	Duobus.

Notice that this word is irregular in the nominative, dative and ablative cases.

There are a few others of this declension, nine in all, whose genitive singular ends in *ius*, and dative in *ai*, but are regular in all the other cases.

VERBS.

It may be profitable at this point, before passing to the study of the other declensions, to devote some attention to the verb, in order that the exercises may be more varied and interesting.

The pharmacist will not have many forms of the verb in his work of reading prescriptions. The most common will be those of the imperative mood and the subjunctive mood, when used as a direction or command.

We trust, however, that the student will not be satisfied with the amount of knowledge that is absolutely required, but seek to know more of the structure of the language, so as to make it of general use.

Acting upon this supposition, we shall present a little fuller treatment of the verb, but will not expect it to cover the whole subject.

The verb has four moods: The *indicative*, which makes a definite statement, as the boy *has* the phial, *puer phialam habet*; the *imperative*, which commands, as, "mix the mass," *miscet massam*; the *subjunctive*, belonging to subordinate propositions, and sometimes to denote permission, when it also implies a command; as, "it may be done," *fat*; the *infinitive*, which corresponds in the main to the English infinitive.

There are six tenses: *Present*, *imperfect*, *future*, *perfect*, *pluperfect* and *future perfect*.

These indicate about the same divisions of time as the corresponding terms in English. There are three persons, two numbers and two voices, *active* and *passive*.

As the number and cases of nouns are indicated by the endings, so in the verbs, the number, tense and person are indicated by the verb endings.

There are four conjugations of the verbs, and as the declensions of nouns are distinguished from each other by their genitive endings, so the conjugations of the verbs are distinguished by their *infinitive* endings.

These endings are as follows:

1st Conjugation.	2d Conjugation.	3d Conjugation.	4th Conjugation.
Active... are	ere	ere	ire
Passive... ari	eri	i	iri

In your dictionary you will find given the first person singular, present indicative, followed by one of the above endings, and from these you are to determine the conjugation to which the verb belongs, and treat it accordingly. For example, you will find *sano*,—*are*, your table of endings shows this to be of the first conjugation; again *repleo*,—*ere*, indicates the second conjugation.

Determine the conjugation of the following forms:

Movo,—*ere*; *nutrio*,—*iri*; *narro*,—*are*; *olco*,—*ere*; *misceo*,—*ere*; *pono*,—*are*; *paro*,—*are*; *pingo*,—*ere*.

The first person passive indicative is formed by adding *r* to the active form; as, *amo*, I love; *amor*, I am loved. *timeo*, I fear; *timor*, I am afraid.

Determine the conjugation of the following verbs: *Potior*,—*ari*; *punior*,—*iri*; *promor*,—*i*; *potior*,—*ari*; *regor*,—*i*; *ador*,—*ari*.

Personal Endings.—The person of the verbs is not indicated by the use of the personal pronoun, as in English, but by the endings of the verb. The personal pronouns are seldom expressed, except to make the subject emphatic.

The personal endings of the present tense, active indicative, of the four conjugations are as follows:

1st Conjugation.	2d Conjugation.	3d Conjugation.	4th Conjugation.
Singular: 1-o	1-eo	1-o	1-ir
2-as	2-es	2-is	2-ir
3-at	3-et	3-it	3-it
Plural: 1-amus	1-emus	1-imus	1-imus
2-atis	2-etis	2-itis	2-itis
3-ant	3-ent	3-unt	3-unt

ANTISEPTIC MOUTHWASHES.—(Ap. Z(g):

I.	
Thymol	0.25 Gm.
Benzoin acid	3.0 "
Tincture eucalyptus	15.0 "
Alcohol	100.0 "
Oil of peppermint	0.75 "

A few drops in a glass of water.

II.	
Thymol	0.3 Gm.
Sp. meliss.co.	30.0 "
Sp. cochlear.	30.0 "
Tinct. Ratanh.	50.0 "
Oil of peppermint	0.5 "
Oil of clove	0.1 "

Ten drops in half a glass of water.

III.	
Saccharin	5.0 Gm.
Dil. alcohol	200.0 "
Oil of peppermint	10 drops

Half a teaspoonful in a glass of water.

IV.	
Tincture Myrrh.	5 Gm.
Spirit Lavender	95 "
Saccharin	1.0 "

Half a teaspoonful to a glass of water.

V.	
Eau de Cologne	50.0 Gm.
Eau de Rose	50.0 "
Saccharin	1.0 "

Half a teaspoonful to a glass of water.

MERCURY OXY-CYANIDE TABLETS.—The advantages of oxycyanide of mercury as antiseptic and disinfectant over corrosive sublimate have been recognized by several investigators. It exerts less irritation on the tissues, does not injure surgical instruments, only slightly coagulates albumins, and does not deaden the sense of feeling at the finger tips. It is only its sparing solubility that has so far precluded more general use. Dr. Pleverling, of Munich, has now discovered a method by which oxycyanide of mercury is formed into tablets, that are easily and quickly soluble in water. They weigh 0.5 Gm. (7½ grains) each, are colored light-blue, non-hygroscopic, and packed in glass cylinders containing 10 tablets. They are but little higher in price than tablets of corrosive sublimate. The salt is used in solutions containing 1 in 1000. (Ph. Centr.)

TINCTURE HÆMOSTYPTICA is directed by Denzel (Ph. Ztg.) to be prepared in the following manner: Powdered ergot 10 p., alcohol 20 p., sulphuric acid 2 p., and water 500 p., are concentrated by boiling to 200 p. To this 2 p. calcium carbonate are added, the liquid separated from the residue by expression, concentrated to 70 parts. 30 parts of alcohol added and the mixture filtered.

A. PH. A. PAPERS.

Read at the Baltimore Meeting, Aug. 29 to Sept. 3, 1898.

THE GOSPEL OF GOOD GOODS.

BY JAMES W. T. KNOX, DETROIT, MICH.

If we may be permitted to paraphrase a very good and very old proposition, we might ask "What shall it profit a man to sell goods all day, if he does not make any money on them?" And what shall it profit a man to put in all his time making ten cent sales when he might as well be selling the same number of twenty-five and fifty cent packages? The retail druggist is in business for what he can get out of it, and when the profit ceases to be sufficient to pay bills and buy bread for his family, it is time to stop and ask "what is the matter? where are we at?" We have all heard of the cut-rate problem discussed in its various phases, I do not know how long, for I have heard it ever since I went into the business eleven years ago. Perhaps we shall hear it for eleven years more before we get it settled. What I have to discuss before you gentlemen of the retail drug trade, is not a "problem," but merely a plain business proposition, something that does not require so much organized as individual effort. It is the question of selling cheap goods.

A President of the United States once aptly said, "A cheap coat makes a cheap man." We might say with equal force that "Cheap drugs make a cheap druggist" in the opinion of the public. Then the cure for that is to throw out the cheap goods.

By cheap goods I mean the dime and nickel packages which litter the counter of so many drug stores, and which for some unexplained reason many druggists push in preference to higher-priced, better and more profitable goods. To be sure there are a few legitimate ten cent articles, such as potassium chlorate lozenges, soda mint tablets, cachous, etc. But headache wafers are not a legitimate ten cent article, neither are pile ointment, laxative tablets and a dozen other articles that might be named. The custom of years has fixed the price of these articles at from twenty-five to fifty cents for packages of appropriate sizes. Now is it not sheer folly to offer goods at five and ten cents when one might just as easily and in the same time sell the twenty-five and fifty cent packages? Let us remember that medicines are necessities, or are considered so by the people who buy them. People do not buy medicines because they taste good or because they are pretty or because it is any fun to buy them—the sole and only reason on earth that they buy our goods is because they need them or think they do, which answers the purpose in our case. Bearing this in mind, why should we teach them to buy in such small amount? What excuse can any druggist offer for pushing a ten cent package of pile ointment on which he makes about three or four cents, when with exactly the same effort and expenditure of time he could sell the regulation fifty cent package and make twenty-five cents on it? (For I am now supposing that the druggist who is wide awake enough to leave dime and nickel goods severely alone is a good enough business man to sell his own preparations, and make a living profit on them.) What is the reason? One man said to me, rather sharply, once when I asked this question "well, the reason is, they sell." Postage stamps sell, but that is no sign that it pays to handle them. A thing must not only sell, but it must pay a profit, and it must not interfere with the sale of something that pays a better profit. I saw a dime package of pile ointment on the counter, and asked: "does this sell?" "Yes," was the reply. "Just sold a package a few minutes ago." "Do you sell five times as many packages of it as you did of the fifty cent article?" I asked. "No, not twice as many, in fact, but few if any more than I sold of the other," he said. "How much of the fifty cent article do you sell, now, that you are pushing the ten cent size?" I asked. "None to speak of," he said. So there it is. This druggist is deliberately cutting his own throat to accommodate some one else. What was true of the article in question was true of nearly everything else in his line of dime and nickel goods. The druggist who pushes that kind of goods is competing not only with all the other fellows, but with himself as well. What does he gain? Nothing. What does he lose? Well, he loses time, for it takes from three to five times as much time to sell the

same amount of ten cent goods as it does to sell twenty-five and fifty cent goods, and if a druggist's time is not worth something to him, he is in a bad way. He loses money, because his higher priced goods, that he has his money invested in, stay on the shelves, while people buy the dime and nickel packages. He loses the confidence of the people that trade with him, because they grow to look on his store as a sort of a cheap counter; nine people out of ten associate cheapness in price with cheapness in quality, and right here, confidentially, I want to say they don't always miss it either when they guess that way. He loses trade because people get to saying, "If you want something good, you can always get it at Blank's," and Blank is his competitor's name. He loses in self-respect, for there are not many druggists who do not feel that they are worthy of better things than handling dime and nickel nostrums.

What to do? Throw out the dime goods, that is to say, take them off the counter and show cases, and put them back where they will not be seen. Then when a man comes in and asks for them, sell him the 25 or 50 cent articles. I used to find it sufficient to say, "Yes sir, we keep those cheap goods for people who want that kind, but we do not even think of offering them to our good customers, the best of everything is none too good for our trade." That always settled it. Not many people want cheap goods, when it comes to medicines. More than that, it is surprising how few calls there are for the dime and nickel goods after they are taken out of display. The fact is that most of them have not merit enough to ever create a steady demand, and if they are out of sight they are surely out of mind. It is not a difficult matter to switch people on to the right track now, because they have not yet become well accustomed to buying in dime quantities. But in a few years it will be different, people will want not only their ointments, pills, cough lozenges and headache cure in dime packages, but they will want ten cent bottles of Cod-liver oil Emulsion, Laxative Syrup, Cough Syrup, Soothing Syrup and Liniment. No druggist wants to see the drug business get in that channel, yet there are thousands of them who are driving it in that direction as fast as they can.

Why not quit it? Why not return to the plan of selling people the largest packages you can induce them to buy, instead of the smallest?

Why not educate the people in the opposite direction instead of teaching them to buy cheap goods? Why not teach them the gospel of good, fair-priced goods? If you expect to get a good thing you are willing to pay for it—why not teach your customers the same thing? You do not expect to get a good suit of clothes for \$5.00, a good hat for \$1.00, or a pair of shoes for \$2.49, but you know very well that in buying a suit of clothes, if you only pay \$5.00, you are less apt to get \$5.00 worth than you are to get \$25.00 worth if you pay \$25.00. Why not educate your customers that good goods are worth paying for, just as truly as good food and good clothing?

I'd rather be a fifty cent pharmacist than a "Dime Druggist" any day. I would hate for people to think that I was running a ten cent counter. If I were going to run a ten cent store I would get into the business of selling tin pans, washboards, flower pots, and cream pitchers. But if I were going into the drug business I would sell good goods that would pay me for the trouble of making the sales, or I would try some other. The same thing applies to all other kinds of goods, drug sundries, fluid extracts and what not. If you get a good thing you have to pay for it, and you ought to be willing to. Most druggists know that, and in fact more people know it than most of us think; that is the reason why it is impossible to show them that it does not pay to fool with cheap drugs any more than it does to buy shoddy clothing, split-leather shoes, or cheap hats.

Above all, look out for your own interests when you are selling goods and heed not the siren song of the smooth promoters of dime and nickel goods. Ask yourself this question, "Will they come into competition with other better, high-priced, and more profitable goods?" If so, you don't want them, for you will not sell enough more to make up the difference. To be sure, this question of dime goods is only a little thing, but the drug business is made up of little things. It's the little things we have to look out for, or we'll never have any big things to take care of.

THE LEADERSHIP OF THE PHARMACOPŒIA.

BY WILBUR L. SCOVILLE, BOSTON, MASS.

The progress of pharmacy in the United States during the century now closing has been marked by well-defined eras, and in each successive step the influence of the United States Pharmacopœia is clearly discernible. By this I mean that in every important action which has been successfully taken, an ultimate analysis of the causes which led to that action will show that the primary stimulus has come from the Pharmacopœia.

Previous to the year 1820, pharmacy was in a chaotic condition; no schools, no laws, no standards, no restrictions, no unity, and but little of pharmacy as we know it to-day. In 1820 our first National Pharmacopœia was issued. It was the signal for reform to both medicine and pharmacy, and it did not pass unheeded. The first need was more general knowledge, and one year after the Pharmacopœia appeared our first college of pharmacy was organized, to be followed two years later by a second, and then by a third within a decade.

But great reforms begin slowly. The conservative element in human nature will not bear sudden changes. The early pharmacopœias had too little of modern science upon which to base a vigorous campaign, and the mystery of the middle ages still clung. The period from 1820 to 1850 saw but little material progress. It was an inchoative period. The developments of chemistry were paving the way for new advances, but the immediate results were few.

In 1850 pharmacists were called to take part in the revision of the Pharmacopœia, and the time was ripe for a second important step in our progress. Roused to a new sense of unity by that convention, a few of the pharmacists met in New York in 1851 to extend that feeling, and in 1852 this National Pharmaceutical Association was organized. This was the signal for widespread organization.

Then came the period of the Civil War, during which all minor questions were merged in the great question of the nation's future; and from 1860 to 1870 the attention of pharmacists was divided. The close of the Civil War saw almost immediately a throwing off of the lethargy which had enveloped the organized colleges and a new activity in their efforts.

In 1870 our smallest State gave the signal for legal restrictions to the practice of pharmacy, by the first law designed to regulate pharmacy. Then the period from 1870 to 1890 saw a rapid crystallizing of the forces at work in the quick succession of city, county and state pharmaceutical associations, the enactment of regulative laws, and the rapid multiplication of colleges of pharmacy. That many mistakes should be made in these precipitous actions is but natural, but these are gradually working out their own remedies.

The Pharmacopœia of 1880 inaugurated another reform in declaring a restrictive war upon the manufacturers of pharmaceutical preparations. The completeness and ability of this Pharmacopœia were recognized from the first, but we have been slow in taking up its challenge. Yet this has in a measure been recognized, and to-day the most prominent question in pharmacy is that promulgated inferentially in the Pharmacopœia of 1880. Lamentable changes in nearly all phases of pharmacy have reacted upon the colleges and resulted in changes in policy, methods and aims. These are even now in the transition stage, and settled conditions do not and cannot yet appear.

In every step of progress thus far, the Pharmacopœia has exerted an indirect and generally unrecognized influence, and has led the way to broader usefulness and greater independence through interdependence. This fact deserves a wider recognition among our pharmacists. In the feverish struggles of the past twenty-five years, we have gotten into a lamentable habit of limiting values to a financial standard, and of criticizing adversely all factors which do not directly meet this demand. The Pharmacopœia has suffered much on this account.

The deplorable part of this is not that the financial aspect is prominent. That is all-important and must have its influence. But too great a stress upon this point tends to narrowness, hinders progress, and in the end defeats its own purpose.

The Pharmacopœia pays far more attention to the demands of business than is commonly accredited to it. It is not primarily a business, but is a professional work. Yet it is something more than a book of formulas, or even a book of standards. It meets many business demands, in a way consistent with professional standing, which are seldom recognized.

Questions of the cost of goods, of preservation and storage, of compatibility, and of elegance, all receive consideration, as well as questions of strength, quality, medicinal value and professional standing. No sound factor in pharmaceutical life has been ignored in the Pharmacopœia, but each has been assigned its proper degree of attention.

A general recognition of the influence of the Pharmacopœia upon the development of pharmacy, and a broader view of its purposes and qualities, would aid materially in solving many perplexing questions, and would hasten our progress. The writer is not here defending the Pharmacopœia in its details. It is the work as a whole, considered in its entirety as related to pharmacy and medicine, that is referred to.

Not a microscopic nor even a telescopic view is the need, but a perspective attitude which considers the whole field and assigns to each detail its due importance. In the consideration of any question, the point of view is of the utmost importance. The midst of the fray is not the point from which to judge the battle. It is only for the commander on the heights overlooking the whole field to know the real condition. So in all the struggles of life it is necessary to view the conditions from the outside, away from the perplexing details and excitement of the struggle, in order to know the true tendencies of affairs and to anticipate new conditions.

A near view of any detail magnifies both its size and its importance. It shuts out auxiliary conditions and brings false impressions. It is the relative, not the absolute importance of any detail which brings the profitable attitude.

It is folly to spend our energies in fighting the strongholds of business, and it is necessary to take the perspective view in order to recognize these clearly.

Much of the criticism which has been heaped upon the Pharmacopœia emanates from a narrow view. It considers a question from one aspect only, and condemns or approves as that aspect may indicate. All aspects of a question are legitimate, but none are fair unless due recognition be given to the others. The *Spiritus Oloratus* of the 1880 Pharmacopœia is a case in point. The Committee of Revision introduced that preparation as a therapeutic agent. The American pharmacist viewed it as a general toilet water, having no relations to sickness, and condemned it without trial. Our English brethren, recognizing the purpose of the committee, approved it and openly declared it an ideal formula, but at home it had, apparently, no friends, and the preparation was ostracized.

Again, the Pharmacopœia directs that some preparation should be made fresh when wanted, for therapeutic reasons; but some zealous critic, viewing this solely from his own pharmaceutical standpoint, advocates a way of preparing it so that it looks like the official but is permanent, implying that permanence, not efficacy, is the chief desideratum in medicine. So frequently does this occur in literature that an outsider would be almost justified in concluding that the chief pride of the American pharmacist is in his laziness.

Such criticisms are easily answered, yet they are seldom challenged because, perhaps, it is the specific duty of nobody in particular to do so. A special sub-committee for this purpose might well be appointed, not to discourage fair criticism, but to lead to broader views and a higher regard for Pharmacy.

Inherently weak criticisms can do little harm to developed pharmacists, but they may do much harm to the student who, finding these widely promulgated and unanswered, concludes that our National Standard is an impractical and wholly theoretical one. A continual dropping will wear away a stone, and there is much reason for the widely prevalent notions regarding the uselessness of the Pharmacopœia, and for the sneers of the physician.

But it is not from unsound criticism that the Pharma-

copœia suffers, but from a lack of understanding or of appreciation of its contents.

A few years ago one of the members of this association published a concise syllabus giving the effects of exposure to air and light upon pharmaceutical chemicals. It was a most useful and interesting compilation and was extensively copied, even into foreign journals of a high class; yet throughout the list of journals publishing it the fact remained unnoticed that almost the entire information contained in the article was included in plain language in the Pharmacopœia, where it is at all times accessible and might be collected by an apprentice. This failure to credit was no fault of the author of that compilation, as it was published.

Again, in the frequent articles which appear upon the subject of incompatibilities, the attitude of the Pharmacopœia in regard to some of the more common difficulties is seldom referred to. The inclusion of three different solutions of arsenic, all of the same strength but of different reactions, the insertion of such salts as sodium chlorate and ferric pyrophosphate, or of morphine, strychnine, etc., as free alkaloids, all have their bearing upon questions of compatibility as distinctly as the addition of acetic acid to Basham's mixture, of hypophosphorous acid to syrup of hydriodic acid.

The Pharmacopœia is a model of terse, vigorous, concise English, and every word is there for a purpose. It is this terseness which makes it so much misunderstood. It contains no stuffing, but it is pregnant with thought. To illustrate again, under Solution of Tersulphate of Iron, in the directions for preparing this solution occur the words "then boil." A manufacturer who has personally made and sold many tons of iron preparations once remarked to the author that he has seen the day when he would willingly have given a large sum for the suggestion offered in that one word "boil." It is the secret of the successful manufacture of some of the scale salts of iron, but it had cost him much in time, material and annoyance to learn it for himself.

The revisers of the Pharmacopœia have always been men of exceptional abilities, opportunities and attainments. They have been generous with their knowledge, and have given many practical points of value to the pharmacist in the Pharmacopœia. But because they are tersely stated, and presuppose some knowledge on the part of the reader, it is a sealed volume to a large proportion of its constituents, and the nuggets of knowledge are as securely hidden from them as the ice-covered gold of the Klondike.

The revision committee has wisely encouraged criticism in order to make more perfect the succeeding issues, and the fruits of intelligent criticism are apparent. The work is not infallible, but it is reliable; it is not a fetch, but it merits our confidence; it is not an all-including work, but it is an all-embracing work.

This is the attitude which pharmacists should take toward it, for their own and for their profession's sake. Not to idealize it, but to recognize its aims and values, is the need. This means a change of view on the part of many pharmacists. Partly from apathy, partly from ignorance, and partly from absorption in questions which have been before us of late, the general attitude toward the Pharmacopœia is either indifference or contempt. From this attitude emanates much of the indifference or opposition to professional progress which is the discouragement of workers in all the lines of advancement. Could the rank and file of our pharmacists be made to recognize the past and present influences of the Pharmacopœia, and to feel a wholesome respect for its breadth and power, the task of the reformer would be much simplified. The attitude of the average pharmacist is the key to all questions pharmaceutical.

For such a change in sentiment we must look chiefly to our colleges, though our examining boards can exert much influence. The spirit of the teacher is the first factor in the case, and the manner of presentation is the second. The first I have no right to judge, but the second may admit of a suggestion.

In most of our institutions the Pharmacopœia is presented in a two-fold way, first in a synthetic study, and second in an analytic study. The first seeks to show what the Pharmacopœia is, and the second to show the details of its make-up, or its why's. If either study be presented

alone, to the temporary exclusion of the other, it amounts to but little. What and why are naturally correlated questions. One accompanies the other as closely as smoke accompanies fire. They spring forth in rapid succession from the four-year-old, and they remain unsatisfied in the four-score-year-old, through their relative importance may then be reversed.

Facts alone have little in them to attract attention, unless they directly affect us, when it is the consequences rather than the facts that interest. But facts with reasons appeal to us.

It is not enough to teach that the Pharmacopœia originated, is revised, etc., as laid down in the Historical Introduction and Preface. The reasons for the conception of the work, and its subsequent changes add life to the facts and make them fertile. Nor is it enough to teach that such a number of pills or of tinctures or of mixtures are official, even though each be considered in detail. Some reasons for the selection of these preparations, their peculiarities from the Pharmacopœial standpoint, and the design which the revisers had in mind when they were adopted, make them of interest whether they are being used freely or not.

So in the analytic study. Reasons which apply only to specific topics interest us only as those topics interest; but reasons which link that topic with others of a like nature, and with the subject as a whole, have a wider and deeper interest.

The what is the sweeping survey of the field, which brings us a panoramic view of the situation; the why is the critical study of details, and is incomplete unless the what is kept in mind.

The two views do not necessarily mean repetitions. The synthetic study is usually made from the physical standpoint, and the analytic from the chemical. A botanical and therapeutical classification could be added to advantage, if time permitted. While many facts might be thus repeated, the change of view makes them of increasing interest, and also develops their relative importance. The main object of study then becomes transferred from a mass of details which the pharmacist should know but finds difficult to remember, to a conception of professional pharmacy as a whole, in which the details are but the dovetailing parts. This puts the emphasis where it can accomplish the most for the student and for pharmacy.

Could we implant in the minds of the students of our colleges this higher regard for the breadth and power and discernment of the Pharmacopœia, the tide would be turned for the betterment of pharmacy.

The natural course of things will force the pharmacist to think deeply upon the commercial problems of pharmacy. Our schools cannot afford to belittle or ignore the vital nature of these questions, but they cannot deal deeply with them, and it is wise, during the few months that the student is under directly professional influences, to inculcate him as deeply as possible with a regard for the professional aspect of his calling. Get him to think little of what is useless and much of what is useful; to study not what he cannot do but what he can do; to search deeper the possibilities of pharmacy, and resist some of the allurements of outside attractions.

This movement has already begun, and those who have tried it have found many practical aspects to it. It is not merely an ideal, though there is much of the ideal in it. But every man has, of necessity, some ideal in mind, to which he never fully attains, but which profoundly affects his life and happiness. Can the pharmacist have a better or more promising ideal than this? And if the pharmacist does not deeply respect his profession, how can he expect that the physician or the public will do so?

PILULÆ ANTIGONORRHOICÆ WERLER, which have been used successfully for years, are composed as follows:—(1). Pichi-salol pills: Ext. pichi sicc., saloli, aa. 2.0 Gm., magnes. et ceræ alb. q. s. ut f. pil. No. XXX. S. 1 to 3 pills daily after meals.—(2). Santal-Salol pills: Ol. santali flavi Ostind., saloli, aa. 2.0 Gm., magnes. et ceræ alb. q. s. ut f. pil. No. XXX, or Ol. santali rubri, saloli aa. 2.0 Gm., magnes. et ceræ alb. q. s. ut f. pil. No. XXX.—(3). Pichi-santal pills: Ext. pichi sicc., ol. santali flavi, aa. 2.0 Gm., mag. et ceræ alb. ut f. pill. No. XXX. (Ph. Ztg.)

APOTHECARIES OF ADMIRAL SAMPSON'S FLEET.

The Pharmacists on the Victorious American Warships Tell the Era of Their Experience.

The return from Cuban waters of the victorious American fleet was made the occasion in New York harbor of one of the most enthusiastic displays of the public's patriotic approval of our Navy that the pages of this nation's history can show. Notwithstanding the fact that there had been no time to make suitable preparation for it, the welcome that the city gave the warships and the brave men aboard of them did not lack heartiness, or sincerity or enthusiasm. Surely the hearts of the sea fighters were moved by it, even as were the hearts of the landsmen by the sight of the returning squadron. And it was a wonderful sight, that procession up the North River on August 20 of the naval commands of Admiral Sampson and Admiral Schley. So many American "men-of-war," returning after such victories had never been seen together before. Those who saw that parade will never forget it, and none of them probably will live long enough to see another like it.

On that day and since, the curiosity and interest of every one who could get anywhere near the warships have been at highest pitch. Ever since coming North the largest ships of the North Atlantic Squadron have been in New York harbor. Most of them have been lying at the Government anchorage, off Tompkinsville, Staten Island. There they have been visited daily by thousands of sight-seers. Throngs have gone down from New York city, and hundreds of people have come from other places to get a look at the war ships. As many as could do so have gone aboard, and examined the iron monsters from stem to stern and from bridge and conning tower to engine room. All have heard the stories of various episodes of the Spanish war which were participated in by the ships. For every man aboard has his story to tell, from the Admiral of the fleet down to the lowliest Jack Tar of them all. Every man of them is proud to show his ship and to recount her prowess and tell of the good service she rendered. The apothecaries of the war ships are no exception in this respect, as was soon found out by the Pharmaceutical Era's reporter who went down to the anchorage off Tompkinsville a few days ago to obtain some account of the experiences of the pharmacists on the big, floating fighting-machines.

THE CONDITION OF THE NAVAL APOTHECARY.

The apothecaries of the United States Navy, as this journal has been pointing out for several years past, do not receive the recognition and treatment to which their merits of training and efficiency justly entitle them. Their lot up to a few months ago was anything but enviable, and there is still room for very great improvement. Last June the Congress enacted a law reorganizing the hospital corps of the Navy. Under this new law the "Secretary of the Navy is empowered to appoint twenty-five pharmacists with the rank, pay and privileges of warrant officers, and to enlist or cause to be enlisted as many hospital stewards, hospital apprentices (first class) and hospital apprentices as in his judgment may be necessary, and to limit or fix the number, and to make such regulations as may be required for their enlistment and government."

This law fixes the pay of hospital stewards, the second grade of the service, at \$60 a month; the pay of hospital apprentices (first class) at \$30 a month, and that of hospital apprentices at \$20 a month, with the increase on account of length of service allowed by law to other enlisted men in the Navy.

Formerly the pay of \$60 a month was the highest allowed to any apothecary in the Navy. During the past five or six years the requirements for admission to the service have been raised to a high standard. Every applicant for the place of apothecary in the United States Navy—or "pharmacist," as he is to be called henceforth—

must be a graduate of a college of pharmacy, which means that he must have had four years' experience in some place where prescriptions are compounded, and, besides being physically sound, must present evidences of high moral character.

Under the former law the apothecaries were rated as chief petty officers in the language of the Navy. They were classed with machinists, carpenters, sail-makers, boiler-makers, and band-masters. There was positively no chance of promotion for them.

Under the new law these things are improved considerably, but the number of pharmacists allowed, only twenty-five for the entire Navy, is far too small, and it is seen at once that the great majority of youths who step from the college's door into the service of their country at sea, hoping to be made warrant officers at once, are doomed to disappointment. Each vessel in the Navy must have its own apothecary, and as there are many times twenty-five vessels of all kinds in the service, it will be seen that the quota of "pharmacists" allowed by law provides such officers for only a very small part of the Navy. It is to be hoped that sufficient pressure may be brought to bear upon the Congress before long to secure the enactment of an amendment to this law to provide for a pharmacist of the warrant officers' rank for every vessel in the Navy.

Presumably owing to the pressure of other duties in the busy time of war, the Secretary of the Navy has not yet appointed the twenty-five warrant officers allowed by the new law from the body of apothecaries now in the service. Nobody in that service knows when the appointments are likely to be made, or which men will be singled out for advancement. Each of the apothecaries on the big cruisers and battle ships is hoping that it may be his good fortune to be included in the first twenty-five naval pharmacists to be appointed. Everybody who knows anything at all about it concedes that there are many more than twenty-five apothecaries now in the navy who deserve such advancement. The Secretary may not find the task of selection an easy one.

Notwithstanding the fact that the apothecaries suffer some hardships and indignities, even aboard the large and splendid war ships, which are looked upon as supplying the very cream of the service, those of them who were interviewed by the Era's reporter had no complaints to utter. Some of them talked with enthusiasm of their work, and said they would not have missed the experience for a great deal. Each expressed the hope that he might be one of the twenty-five apothecaries soon to be raised to the rank and pay of a warrant officer, and each expressed the desire that an effort might soon be made to increase the number of such officers in the Navy.

On the morning that the Era's reporter visited the squadron lying off Tompkinsville, the vessels at anchor there were the protected cruiser New York, the nag-ship of Admiral Sampson, the protected cruiser Brooklyn, flagship of Admiral Schley, the battle ship Texas, which at the time was flying the flag of Commodore Phillips; the battleship Massachusetts and the battleship Indiana.

ON THE FLAGSHIP NEW YORK.

Edgar Mumma, the apothecary of the flagship New York, was found in the dispensary of that vessel, which is situated between decks in the after part of the ship. He was not very well, hardly having recovered from an attack of intermittent fever. Mr. Mumma enlisted from Maryland, and has been in the service four years, all of that time aboard the New York. He said:

"There is not very much that I can tell you about our experiences on board the New York during the war that has just ended, which would be of interest as pharmaceutical matter. We were ready for a conflict before war was declared, for we believed, many of us, that severe trouble was brewing, and that the supreme crisis of the

Cuban difficulty must be near at hand. The history of



EDGAR MUMMA.
Apothecary of the New York.

amount we ever have in usual times. We had two operations to perform, at which I assisted, and these, with the care of the fever cases, kept me so busy that I did not have much time for anything else. I finally caught the fever myself, and though it was not very severe, it was decidedly disagreeable, and took the life and spirit out of me.

"I did not see very much of the fight at Santiago, and did not go aboard any of the Spanish vessels after it was over. While the other vessels were picking up the wounded crews of the Spaniards, our ship had other work in hand, so I was not called upon to attend any of the Spaniards. Many of the boys on our ships secured numerous relics and curiosities at various times from the Spanish fleet. The only souvenir of the kind that I secured is a pair of small balances; but these were made in America, and are not of any very great interest or significance."

APOTHECARY'S EXPERIENCE ON THE BROOKLYN.

Joseph McKee, the apothecary on the Brooklyn, Admiral Schley's flagship, had some novel and thrilling experiences, and after the great fight in front of Santiago, secured a number of interesting relics of the conflict. He showed the reporter a large signal flag, taken from the Almirante Oquendo, two revolvers, ruined by fire, which he had picked up from the ruins of the *Vizcaya*, a handful of Spanish silver dollars, and a Spanish gold coin about the size of a five-dollar gold piece, which was covered with blood, and which he had found on the Cristobal Colon. He also had a large mass of silver coins, taken from one of the destroyed Spanish vessels, which had been partly melted and fused together into one solid lump by the intense heat of the burning ship. He talked entertainingly about these and other interesting relics, and about the wonderful exploits of his ship, the Brooklyn. Mr. McKee's home was in Bridgeton, N. J. He has been in the service eighteen months, and has spent all the time, with the exception of a few weeks at first, on the Brooklyn. He said:

"We were very fortunate while in the South in having no sickness to speak of on board the Brooklyn. In battle we had one man killed and one severely injured by the explosion of a shell. The man who was killed was the Captain's clerk. He was standing on the upper deck, just a little to the side of the turret, and was taking the range of the ships with a statometer. He was struck by a shell which came across the ship from the opposite direction, and killed instantly. His head was taken off, as if by a swift and dextrous sword-stroke. We also had some minor wounds to look after, but no further damage received in battle was at all serious, and this, notwithstanding that the Brooklyn was hit by Spanish shells, little and big, thirty-five times. Our escape with so few casualties was miraculous.

"I was assisting about the gun deck during the battle, and had plenty to do, I can assure you caring for five of the men who received flesh wounds on their legs. We

cared for them on the Brooklyn for a few days after the fight, and then sent them to the ambulance ship, the Solace. They were recovering rapidly when we last heard from them.

"I did not see very much of the fight, although we were in the thick of it from first to last. Being kept so busy in my own quarters, I heard more than I saw of the actual battle. But later I went on deck and had a splendid view of the chase of the Colon. The Cristobal Colon surrendered to us, but we did not pick up any prisoners from any of the Spanish vessels; that work was done by other ships.

"A week after the engagement several of the sailors went ashore and visited the wrecks, and picked up Spanish shells and other relics. One of the men found a loaded shell, which he brought back to the ship with him. He did not want to keep it throwing about in that dangerous condition, so he tried to remove the charge. He went up on deck and tried to do it with a hammer and chisel. Of course the shell exploded, and he was severely wounded in the abdomen, a piece of the shell penetrating an intestine. We did all that we could for him, and for some time entertained hope of his recovery, but in spite of all that we could do for him he died the next day.

"Since the battle we have been very fortunate in having only a small amount of sickness on board. There are a few cases in the sick bay at present, but none of them is very serious, and the ship's company for the most part is in excellent health.

"My experiences have been interesting in a way, but so far as the practice of pharmacy is concerned I have been called upon to do little that was out of the normal routine of the service in times of peace. During the period since I enlisted I have had some enjoyable times, for the life is not entirely without its pleasures. I have seen a good many places which otherwise I should not have seen probably for a great many years, if at all. Last year we had a very enjoyable cruise, the Brooklyn being sent to participate in Queen Victoria's Jubilee celebration. While over there I visited several of the leading English cities and visited some of the largest drug establishments of London, Apothecaries Hall, and other places of interest to the trade, and altogether it was a trip I enjoyed very much. We returned to New York about January 1st. Then we cruised south to the West Indies. We were at St. Thomas for some time, and I



JOSEPH MCKEE.
Apothecary of the Brooklyn.

found there one of the most interesting old drug stores that I have ever visited. St. Thomas is one of the most delightful winter resorts imaginable. From there we went on further south, cruising along down the coast of South America. We expected to be recalled at any time, and had no idea that we should get as far south as we did, for we had heard at St. Thomas of the blowing up of the Maine, and we all felt that that meant serious trouble and serious work for us to do, probably before very long. We were simply nonplussed on hearing the news that the Maine had been destroyed, and at first could hardly believe it. As we entered the harbor at St.

Thomas, we saw that the flags on all the men-of-war lying at anchor there were at half mast, but we never dreamed that this denoted any loss to the American Navy. The pilot who came out to meet us told us that it meant the Maine had been blown up in Havana Harbor, but we were still in doubt until his word was corroborated by what we heard on shore.

"Finally we were recalled from our Southern cruise, and sent to Key West in time to join the fleet which sailed to blockade the Cuban ports."

Mr. McKee very kindly showed the reporter through the ship, pointing out the spots where the two unfortunate men had been killed, and several of the places where the vessel had been struck by Spanish shells in the fight before Santiago. In one place the side of the ship between decks was penetrated by an 8-inch shell, which exploded in the mess room. Fortunately, at the moment nobody happened to be near enough to receive any injury.

APOTHECARY KEPT THE INDIANA'S BATTLE TIME.

C. E. Alexander, the apothecary of the battle ship Indiana, also had some interesting experiences to recount. Mr. Alexander, whose home is in York, Pa., enlisted about one year ago, and after a few weeks' service on the Wilmington, was transferred to the Indiana with which vessel he has been ever since. For his own pleasure, ever since his assignment to the Indiana, he has kept a diary of each day's happenings. He was the only man on the Indiana who kept the ship's time during the bombardment of San Juan, Porto Rico, and it was his record which was spread on the ship's log. Mr. Alexander said to the Era's reporter:

"The Indiana was coaling at Tortugas when hostilities began. Immediately we were ordered to Key West to join the fleet. Sailing from Key West southward we saw the first shot of the war fired. For several days we patrolled off the Cuban coast in the vicinity of Havana. On April 25 we captured the Panama. We were patrolling in front of Havana with occasional runs to Key West and Tortugas for coal and supplies, from April 22 to May 1. On May 4 we were ordered to go to Porto Rico, and we were the second ship in line at the bombardment of San Juan on May 12. During that engagement I took the ship's time, which was entered on the log. I took it simply for my own interest, and had no idea that it was not being taken by anyone else. But such was the case. In the excitement I was the only man aboard who kept any record of the ship's time. On May 19 we were back in Key West; then we went back to Havana, after which we made several short flying trips. The Indiana was the flag ship that escorted the troop ships which sailed for Cuba on June 15th. Having conveyed them safely to Balquidre we left them on June 21st, and on that day had a single handed go with the forts at the entrance to San-Hago Harbor. On July 2 we engaged the forts again. On the following day, July 3, as you know, we were in the thick of the fight. So you see we were right in it from the beginning, having a part in practically every important naval episode of the war in this part of the world.

"Fortunately we did not have any casualties, or meet with any damage during the battle. Practically, the only man who was hurt was not touched by the Spanish fire, but accidentally fell down a magazine hatch, and he was not hurt seriously.

"After the battle, Assistant Surgeon G. D. Costigan and I went ashore and treated fifty or sixty of the wounded Spanish sailors. In a way, that was one of the most interesting experiences I had. We did what we could for the poor fellows, but there were many of them who were too near dead when we got to them to be saved by us.

"On the fourth of July the Reina Mercedes tried to escape. The Indiana aided the Massachusetts in preventing her from going so, and while so engaged received a shell through the quarterdeck from the forts. The shot tore the officers' quarters to pieces, but did no great amount of damage, and injured nobody.

"On July 6 and 7 we were engaged in the bombardment of the city. After that our duties were of a quieter nature. We left Santiago on July 17, but remained in Southern waters nearly a month longer. On August 14 we left Guantanamo and came North to New York with the rest of the fleet.

"I think the ship has been remarkably fortunate, considering the work that she has done and the varied service she has seen. We have had no contagious fevers and no really serious sickness of any kind on board, notwithstanding our long service in Southern waters. I helped in one good operation, the amputation of the leg of the commander of the Spanish torpedo-boat-destroyer Pluton."

The Era's reporter visited also the battleships Texas and Massachusetts.

The Texas he was not permitted to board, and though he asked to be permitted to see the ship's apothecary, permission was refused, because visitors were not allowed that day. The reporter succeeded in going aboard the Massachusetts, although it was not a visiting day on that ship either, but the apothecary, Henry Budenbom, sent up word that he was not feeling well enough to receive anybody.



HENRY BUDENBOM.

Apothecary of the Massachusetts.

The battleships Oregon and Iowa, which were the first of the large vessels that came North with Admiral Sampson to be detached from the squadron and sent to the Brooklyn Navy Yard for overhauling and repairing, were afterward visited by the Era's reporter at the Navy Yard.

SINGS THE PRAISES OF THE OREGON.

By her long trip from San Francisco around Cape Horn and up to Cuban waters, and by her wonderful exploits in the battle of July 3, the Oregon has proved herself one of the most marvelous battleships ever constructed. Every man who was aboard of her during those exploits believes that she is without exception the most wonderful vessel the world has ever seen. One and all are never weary of singing the praises of their ship, and insist that she cannot be beat by anything afloat. All of the men had absolute confidence in Captain Clark also, and are proud of him as a fighting officer. The ship's apothecary is no exception in this respect. He was glad to talk about the Oregon and her exploits, and said he would rather be on the Oregon than on any other ship in the navy. This apothecary's name is William E. Pearman. His home was in Illinois and he has been in the service ten years. He has served on the Monocacy, the Mohican, the Maric, the Independence and the Oregon. He has been on the Oregon ever since she went into commission two years ago. When he was seen by the reporter for the Era Mr. Pearman said:

"Well, I didn't have any experiences to speak of in the pharmaceutical line. The health of the ship's company has been remarkably good, and is pretty good yet, although, of course, owing to our long stay in the hot Southern waters, many of the men are somewhat tired and debilitated.

"We had a delightful cruise all of the way round from San Francisco. We did not know that war had been declared until we got as far up on this side as Rio Janeiro. Of course, we were prepared for anything at any time, but I believe nobody on the ship had any fear or apprehension. Every member of the crew felt the greatest confidence in the ship and in Captain Clark. Of course, we knew that the Temarario was down there, perhaps waiting to intercept us, and we knew also that it was entirely possible that we might run plunk into Cerbera's fleet, but I do not think this knowledge caused anybody on board to feel the least bit of fear. Of course, on the run up from Brazil the greatest care was exercised and the Captain was very watchful. We did not wait or hesitate, but sailed along as rapidly as we could, the only difference being that we showed no lights at night and that the night watches were doubled—yes, tripled—all the time until we reached Key West. There was considerable expectancy, not to say eagerness, to

meet some Spaniard, and everybody on the Oregon felt that if we did meet any hostile vessel we should be able to take care of it.

"When we were near Cuba on the way up we actually passed through Cervera's fleet. We believed that we did at the time, although we were not positive. We passed between two ships that were signaling to each other one dark night. As we carried no lights the Oregon was not seen. We thought these must be two of the ships of Admiral Cervera's squadron, and it turned out that they were. After the battle of Santiago we picked up three Spanish prisoners from the Colon. They told one of our boys, who understands Spanish, that we must have passed very closely to the Spanish vessels on our way North. They said that on the day following the night on which we had seen the signals one of the Spanish ships picked up an empty sugar barrel having on its head the words 'U. S. S. Oregon.' From that Admiral Cervera knew that the Oregon had escaped him, and so went on straight to Santiago.

"I think the finest test of the Oregon was in the battle of July 3. The things that she did in that battle were simply too marvelous for belief. When I look back and remember what this ship did I cannot comprehend it. I do not believe in inanimate things turning animate, but if ever such a thing happened in the world it certainly happened to the Oregon in the battle of Santiago. I never should believe it if I had not been there and seen it with my own eyes. You know on patrol duty, or rather blockade duty, each vessel had its individual place off the Cuban shore. The Oregon was well to the eastward of the entrance to Santiago harbor. There were half a dozen or more vessels west of her. When Cervera made his rush from the harbor on the morning of July 3 he steamed to the westward as fast as he could go. The Oregon was one of the first to give chase, and was in the fight from the very beginning to the finish. Now the wonder was how the Oregon could pass the other ships. She did pass them, even such ships as the Brooklyn, which has a rated speed of several knots more than the Oregon.

"Of course, I did not see anything of the first part of the fight. My duty was at my post down between decks. But fortunately I did not have very much to do. The Oregon did not receive one genuine hit, and was not damaged in any way. None of her men was killed and none was injured seriously. A few small shells from the Spaniards broke in the air over the ship, and the fragments left their marks on the deck and parts of the superstructure, but these were the merest scratches. The only man who suffered even a temporary disablement was one of the gunners. The breech of the gun was not properly secured before firing, and consequently some of the powder blew out the wrong way. This man was standing right behind the gun, and he received its backward charge in the face and chest. Some of the powder, or rather the smoke and fumes of the saltpeter, got into his eyes and blinded him, and some of the powder burned his chest slightly. He was brought down to the operating table, and when I asked him what was the matter he said he could not see. I bathed his eyes and in two or three minutes he jumped up rubbing them with his hands, and exclaiming, 'I'm all right now; I can see again,' he rushed back to his gun. We tried to keep him back, but could not do so. As long as he could see he was going to stick to that gun.

"I doubt if any of us realized how serious the work was that was being done that morning. We had had so much drilling and target practice that it seemed simply like a repetition of what we had been through many times before, and everybody worked with perfect coolness and level heads. Between the fiercest part of the battle and the end of it—that is, from the time the Oquendo was beached and the captain gave the order to cease firing, until we came up with the Cristobal Colon and began belching fire at her—there was an interval of 45 minutes. It was then that we had our dinner, or luncheon, in any place we found most convenient to eat it, and then for the first time I found opportunity to go on deck. I went up above and saw seated on the deck as comfortably as you please a few of the boys playing a game of cards. They showed no fear or uneasiness whatever, and were simply doing this to while away the time until the fighting should begin again. Remember, during this time the Oregon was

racing after the Colon under pressure of all the steam in it could be crowded on.

"I believe that Captain Clark is a great fighting captain. He handled the ship differently in action from the other captains of battleships, and, although I don't know much, if anything, about handling a ship, I believe it was the way he maneuvered the Oregon that prevented her being struck by the Spaniards. He kept her zig-zagging through the water and darting about all the time, and kept the Spanish gunners guessing. Her movements were so rapid and so frequently changed from one direction to another that they could not get the range.

"After the battle was over the assistant surgeon and a trained nurse we had on board made a visit to the Colon. They found three Spaniards who were wounded and brought them aboard the Oregon. The other Spanish sailors were picked up by other vessels of our fleet. We cared for these fellows as well as we could, and later transferred them to the hospital ship Solace. We heard afterward that after they had come North they were in better condition than any of the other Spanish prisoners taken in that battle. But perhaps that was owing to the fact that because we had such a small number we could give more attention to each individual than could our colleagues on the other ships which had taken very large numbers of Spanish prisoners.

"We have had no serious sickness on the Oregon, and, notwithstanding all that the vessel has passed through, have not lost one man. The crew numbers about 520 men. In addition we had about 60 of the Chicago Naval Reserves, who joined us after we reached Florida, and who were with us until the end of the war. They left only two or three days ago. Those fellows have been given so much praise in the newspapers that some of the regular enlisted men have felt a little bit jealous, but they certainly did do remarkably good work and behaved just as well in battle as any of the regulars. I do not begrudge them any amount of praise, for they certainly deserve all that they got."

A BOY WHO IS GLAD HE ENLISTED.

The apothecary who was on the battleship Iowa during the scenes of conflict was N. T. McLean. He left her almost immediately after the battle of Santiago to receive his discharge, his term of service having expired. The new apothecary assigned to the Iowa in his place is Louis Hildebrandt, a young man who was graduated from the New York College of Pharmacy in the class of 1898. Before going to the Iowa he was on one of the small boats of the Northern patrol fleet. He originally enlisted for one year, but later had his papers changed and the enlistment lengthened to the three-year term. If he had not done so it is not at all likely that he would have been sent to the Iowa. Mr. Hildebrandt said to the Era reporter:

"I have been with the Iowa six or seven weeks, going to her just too late to witness the battle of Santiago. I am very well pleased with what I have seen of the service. It is very much different from clerking in a drug store ashore, and I believe that I like it better, for a time at least. My work at present is light, as the health of the crew is very good indeed. I understand that as soon as the necessary repairs and alterations can be made the Iowa is to go on a cruise around the world. It is said that she is to be tested to see what a sea-going battleship can do, and that her first stopping place after leaving here, with the exception of mere coaling stations, will be Honolulu. From there it is expected that she will go to Manila. Well, I wouldn't miss that for a great deal, and I am very glad now, I can tell you, that I changed my enlistment from one to three years."

TRAUMATOL is a new name for iodoform, or iodo-cresin, which was introduced as an antiseptic in 1897. It should not be confounded with "traumatism," a solution of India rubber in ether and carbon disulphide, used as a surgical dressing. Traumatol is claimed to be a perfect substitute for iodoform and corrosive sublimate. It is a fine, light, reddish-violet powder, odorless, not changed by light and air, and contains 54 per cent. of iodine. Traumatol is insoluble in water, alcohol and acids, but very soluble in chloroform. It exerts an anesthetic action without irritating the mucous membranes. (Ph. Post.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

To Stick Labels To Tin.

(Subscriber X.) A number of formulas for pastes of this character appeared in the Era of June 2, 1898, page 830.

Duplicator or Hectograph.

(J. L. B.) Formulas for gelatinous compounds used for copying processes are given in the February 10 and June 2 issues of the Era, this year, pages 212 and 830 respectively. Comments on operating the hectograph and formulas for inks may be found on page 220, August 18, 1898, issue.

Clarification of Olive Oil.

(G. A. S.) The general methods followed by manufacturers in the expression of olive oil are quite fully outlined in an article on the "Extraction of Olive Oil," published in this journal August 12, 1897, page 198. This article originally appeared in the Year Book of the Department of Agriculture, 1896, which volume also contains much additional information on olive culture in the United States.

Aqua de Placebi.

(R. L. L.) We know of no preparation under this title which is evidently a combination of Latin and French, and may mean anything to which its originator may choose to apply it. The latter part of the title "placebi," may be read as "placebo," meaning, of course, "anything prescribed for the purpose of pleasing or humoring the whim of a patient rather than for its therapeutic effect," but even then, its meaning is far from conveying any definite information.

Tincture of Saw Palmetto.

(Subscriber.) There is no special formula for this preparation, though the following process may answer your purpose:

Saw palmetto berries, in No. 40 powder 250 grams
Alcohol, a sufficient quantity to make 1000 c.c.

Moisten the powder with about 100 c.c. of alcohol, and macerate for 24 hours; then pack it firmly in a cylindrical percolator, and gradually pour alcohol upon it until 1000 c.c. of tincture are obtained.

Creosote and Tincture Chloride of Iron.

(H. L. H.) Creosote is incompatible with tincture chloride of iron. With all solutions of ferric salts creosote gives a violet-blue color, changing to a greenish-brown, and unless in very dilute solution a brown precipitate is formed. According to the United States Dispensatory, an alcoholic solution of creosote with an alcoholic solution of ferric chloride gives a bluish-green color. The addition of light calcined magnesia to a mixture containing these substances serves to complicate the reactions, the magnesia precipitating the tincture of iron.

Emulsion of Iodoform.

(T. D. C.) There are a number of formulas for emulsion of iodoform, the first of those following being published some years ago in the British Medical Journal:

Iodoform 3 parts

Starch 1 part

Triturate in a mortar until a fine powder results, and then add the following mixture:

Glycerin	20 parts
Water	12 parts

Warm gradually, and stir constantly until 123° C. is reached. The resulting emulsion will be 10 per cent, and is very stable. Moreover, it is found to act more energetically than the emulsion prepared in the ordinary way.

(2) Iodoform	2 grams
Oil sweet almonds	8 grams
Saponin	0.12 grams
Water	100. grams

Imperial Tooth Powder.

(T. W. R.) The following prize winning formula was published under the above title in the January 1, 1892, issue of this journal:

Precipitated chalk	8 ounces
Powdered castile soap	1 ounce
Powdered cuttlefish bone	1/2 ounce
Orris root	1/2 ounce
Oil wintergreen	1/2 fl. dram
Carmine coloring q. s. to suit.	

To the chalk add a suitable amount of the coloring by trituration, sift through an ordinary sieve, and set in a warm place until thoroughly dry. Mix the soap, cuttlefish bone and orris root; to this add the oil of wintergreen, then add the colored chalk. Run all through bolting cloth if the pink tint be not deep enough, add more of the carmine coloring before sifting.

Roach P.owder.

(W. & C. Co.) Some formulas were published in this journal June 30, 1898, page 987. Here are some others:

(1) Wheat flour	4 ounces
Sugar, powder	8 ounces
Borax, powder	2 ounces
Unslaked lime	2 ounces

Keep dry. This should be strewn about on paper, taking care that no liquids are left uncovered.

(2) Plaster of Paris	4 ounces
Oatmeal	8 ounces
Sugar	2 ounces

All should be in the powder and should be well mixed.

(3) Tartar emetic	140 grains
Insect powder	16 ounces

(4) Chamomile	2 ounces
Borax	12 ounces
Insect powder	2 ounces
Plaster of Paris	1 ounce
Sulphur	3 ounces
Crude arsenic (so-called "cobalt").	120 grains

All should be in powder and should be well mixed.

Effervescent Sodium Phosphate.

(E. L. A. B.) The following formula is official in the British Pharmacopoeia:

Sodium phosphate, in crystals	500 grams
Sodium bicarbonate, in powder	500 grams
Tartaric acid, in powder	270 grams
Citric acid, in powder	180 grams

Dry the sodium phosphate until it has lost 60 per cent. of its weight; powder the product and mix it with the other ingredients. Place the whole in a dish or pan of suitable form heated to between 200° and 220° F. When the mixture, by aid of careful manipulation, has assumed a granular character, separate it into granules of uniform and convenient size by means of suitable sieves. Dry the granules at a temperature not exceeding 130° F. The product should weigh about 1,000 grams. Dose, 60 to 120 grains, for repeated administration; for a single administration, 1/4 to 1/2 an ounce.

A similar preparation may be made after the general process for effervescent powders in the National Formulary.

Printing Ink.

(B. W. B.) The manufacturing of printing ink requires much experience and the use of suitable machinery, and we think you will find it much more satisfactory to purchase the supply you will need from a dealer in printers' materials than to undertake the manufacture yourself. However, a general process was outlined in the April 30, 1896, Era, page 554, from which you can glean some information. Here are two more formulas:

(1) Roll 14 gallons old clear linseed oil to the consistency of a thick varnish; while hot, add to it, during constant stirring, first, 6 pounds powdered resin, and next 1 1/2 pounds dry brown soap shavings; then mix in it 2 1/2 ounces

indigo blue, $2\frac{1}{2}$ ounces Paris blue, and 5 pounds best lamp-black. After standing for a week it should be ground.

(2) Balsam copaiba, 9 ounces; lampblack, 3 ounces; Paris blue, $1\frac{1}{4}$ ounces; Indian red, $\frac{1}{2}$ ounce; dry resin soap, 3 ounces. These will produce a superior black ink. By employing white soap instead of yellow, and a sufficiency of some coloring pigment instead of black, blue and red mixture, a good colored ink will be obtained.

Harness Dressing.

(J. L. B.) The following have been recommended:

- | | |
|----------------------|--------------|
| (1) Myrtle wax | 2 av. pounds |
| Beeswax | 2 av. pounds |
| Tallow | 2 av. pounds |
| Lampblack | 1 ounce |
| Castor oil | 2 pints |
| Neatsfoot oil | 1 gallon |

Mix well together by aid of a gentle heat.

- | | |
|---------------------|---------------------|
| (2) Fish oil | 1 pound |
| Neatsfoot oil | 1 pound |
| Tallow | 1 pound |
| Beeswax | 4 ounces |
| Lampblack | $\frac{1}{2}$ ounce |
| Oil mirbane | 4 s. |

Mix as above.

- | | |
|----------------------------|----------|
| (4) Mutton suet | 2 ounces |
| Yellow wax | 6 ounces |
| Melt and add white warm | |
| Spirit of turpentine | 8 ounces |

Add the mixture to the following, previously reduced to powder and mixed:

- | | |
|---------------------|-----------------------|
| Sugar candy | 6 ounces |
| Lampblack | $2\frac{1}{2}$ ounces |
| Prussian blue | $\frac{1}{2}$ ounce |
| Soft soap | 2 ounces |

Mix well.

Urinometer Scale and Specific Gravity.

(G. A. S.) The hydrometers illustrated on page 743 of the May 19, 1898, issue of this journal, are graduated according to the arbitrary scale of Baumé, and require the use of a table or special calculation to obtain the true specific gravity. They illustrate perfectly the theory upon which hydrometers are constructed, but they are not so readily adapted for taking the specific gravity of urine as a hydrometer or urinometer graduated with a scale indicating the true specific gravity of urine. To use the urinometer the urine to be tested is poured into a narrow jar, a little wider than the bulb, and after the air bubbles have escaped the urinometer is immersed in it. When the urinometer comes to rest, the degree at which it stands is read off below the surface. Usually, the last two figures only of the density are marked on the scale, as 12, instead of 1.012, etc. Of course, the temperature must be taken into consideration, and as decrease in density of urine is about 1° for an increase in temperature of 3° to 5° C., it is important that the test be made at a definite known temperature, as 15° or 25° C. Thus, we find urinometers graduated to give the correct reading at these temperatures. The specific gravity of urine varies approximately as does that of water, with changes of temperature, and tables have been constructed by use of which corrections of this character may be readily made.

Cleaning Kid Gloves.

(R. L. L.) We cannot give the formula for the preparation you name. The following formulas, however, may prove of service:

- | | |
|----------------------------|-----------|
| (1) Methylated ether | 100 parts |
| Benzol | 200 parts |

Put the gloves on the hands and rub thoroughly with the solution with a clean piece of flannel. Let the greater part of the fluid evaporate before taking off the gloves; then hang them up in a current of warm dry air until the smell of the fluid has evaporated. Do not put the gloves near a naked flame while moist with the liquid.

- | | |
|--------------------------|--------------|
| (2) Benzoin | 1 gallon |
| Chloroform | 4 fl. ounces |
| Ether | 4 fl. drams |
| Oil bergamot | 1 fl. dram |
| (3) Oil turpentine | 5 ounces |
| Water of ammonia | 4 ounces |
| Wood alcohol | 5 ounces |
| Ether | 4 drams |
| Acetic ether | 4 drams |
| Water | 5 ounces |

- | | |
|----------------------------------|-----------|
| (4) Castile soap, shavings | 12 ounces |
| Hot water | 8 ounces |
| Solution chlorinated soda | 8 ounces |
| Water of ammonia | 4 drams |

Dissolve the soap in the water, allow to cool, and incorporate with the solution and water of ammonia so as to form a smooth paste. In using, rub a small portion over the glove by means of a piece of flannel, always rubbing in one direction until clean.

Marking Ink for Bales.

(W. H. W.) The following have been recommended:

(1.) Boil 1 pound of logwood chips in 1 gallon of water for ten minutes; then stir in $\frac{1}{2}$ oz. of bichromate of potassium and boil ten minutes longer; add, when cold, $\frac{1}{2}$ pound gum arabic, previously dissolved, and stir well in. This ink is said to flow well from the pen, and will mark cotton bags with either the stencil plate or block.

(2.) Shellac 2 parts, by weight; orax 2 parts; water 25 parts; gum arabic 2 parts; Venetian red, sufficient to color. Boil the shellac and the borax in the water until solution is complete, add the gum arabic, and take the vessel from the fire. When the solution has become cold, add sufficient Venetian red to bring it to a suitable consistency and color. The ink should be preserved in a glass or earthenware vessel. If a color other than red be desired, substitute for it lampblack, ultramarine blue, or a mixture of ultramarine blue and chrome yellow.

- | | |
|-------------------------------|----------|
| (3) Cochineal, powdered | 2 ounces |
| Cream tartar | 2 ounces |
| Mix, and add | |
| Boiling water | 8 ounces |

Allow the mixture to stand for a quarter of an hour, then neutralize by adding

- | | |
|---------------------------|---------|
| Potassium carbonate | 1 ounce |
|---------------------------|---------|

Again allow the mixture to stand for a short time then add

- | | |
|----------------------------|----------|
| Alum, powdered | 1 ounce |
| Gum arabic, powdered | 1 ounce |
| Starch | 2 ounces |
| (4) Asphalt | 1 ounce |
| Canada Balsam | 1 ounce |
| Oil turpentine | 4 ounces |

Drop black, sufficient quantity.

Dissolve the first two named ingredients in the oil of turpentine, and add enough drop black to make a cream.

Polish for Tan Shoes, Patent Leather, etc.

(R. B. H.) We cannot give formulas for any of the proprietary articles on the market. However, some formulas for polishes and dressings suitable for various shades of leather may be found in this journal, August 11, 1898, page 182. Here are some formulas for patent leather shoe polish:

- | | |
|----------------------------------|--------------------------|
| (1) Yellow wax, or ceresin | 3 ounces |
| Spermaceti | 1 ounce |
| Oil of turpentine | 11 fl. ounces |
| Asphalt varnish | 1 ounce |
| Borax, powder | 80 grains |
| Frankfort black | 1 ounce |
| Prussian blue | 150 grains |
| Oil mirbane | $1\frac{1}{2}$ fl. drams |

Melt the wax, add the borax, and stir until a kind of jelly has been formed. In another pan melt the spermaceti; add the varnish, previously mixed with the turpentine; stir well and add to the wax; lastly, add the colors, mix well, and incorporate the oil of mirbane.

(2.) French Paste for Patent Leather.—To preserve the gloss of patent leather the following preparation is used: Melt pure wax over a water bath. Place it on a moderate coal fire, add first some olive oil and then some lard, and mix intimately by stirring. Then add some oil of turpentine, and finally some oil of lavender. The resulting paste is filled in boxes, where, on congealing, it will acquire the requisite consistency. Apply a little of it to the shoe or boot, and rub with a linen rag, which will restore the gloss to the leather and keep it soft and prevent cracking.

- | | |
|-----------------|---------------------|
| (3) Gum | 8 ounces |
| Treacle | 2 ounces |
| Ink | 1 pint |
| Vinegar | 1 ounce |
| Sweet oil | 1 ounce |
| Alcohol | 2 ounces |
| Lampblack | $\frac{1}{2}$ ounce |

(4.) Cracks in patent leather: Take $\frac{1}{2}$ pound molasses or sugar, 1 ounce gum arabic and 2 pounds ivory black; boil them well together, then let the vessel stand until

quite cooled, after which bottle off. This is an excellent reviver and may be used as a blacking in the ordinary way, no brushes or polishing being required.

Tasteless Cod Liver Oil Compound.

(H. L. G.) The following formulas have been published under the above title:

(1) Gaduol	64 grains
Fluid extract of wild cherry	2 fl. ounces
Fluid extract of licorice	3 fl. ounces
Glycerin	1 fl. ounce
Simple syrup	1 fl. ounce
Fluid extract of malt	6 fl. ounces
Compound syrup of hypophosphites	3 fl. ounces
Fuller's earth, powder	240 grains
Caramel, sufficient.	

Mix the gaduol with the glycerin and triturate with the fuller's earth; add the fluid extracts, syrup and malt, shake well, let stand for a day, agitating occasionally; filter, and to filtrate add the syrup of hypophosphites and sufficient caramel to color.

(2) Syrup hypophosphites compound	2 ounces
Fluid extract wild cherry	2½ ounces
Extract malt	1 ounce
Alcoholic extract cod liver oil	4 ounces
Alcohol	1½ ounces
Fluid extract cassia	½ ounce
Glycerin	2 ounces
Simple syrup	3¼ ounces

The alcoholic extract of cod liver oil is prepared by extracting the oil with 90 per cent. alcohol and then evaporating the alcohol, which gives an extract known as morrhuel, and claimed to represent all of the valuable properties of cod liver oil.

(3) A simpler preparation, containing wine, may be made as follows:

Gaduol (Merck's)	32 grains
Port wine	13 ounces
Alcohol	1 ounce
Simple elixir (red) enough to make	16 ounces
Magnesium carbonate	¼ ounce

Dissolve the gaduol in the alcohol and add to the magnesium carbonate in a mortar; triturate well, slowly adding the wine; filter, and add enough simple elixir to measure 16 fluid ounces.

Manufacture of Grape Juice and Wine.

(W. G. M.) Unfermented wine, or grape juice, may be prepared by expressing the juice of ripe grapes and heating it in bottles to a temperature of from 60° to 70° C. for fifteen minutes, the heat rendering the yeast cells and other fermenting agents inactive. The juice can then be kept in well closed bottles for several years without fermenting. To obtain the juice clear it must be filtered, an operation which is easily carried out, as the heating will have coagulated the mucilaginous substances causing turbidity. Filtration may be carried out immediately after heating the juice, or after some time; but in any case the filtered juice must be again heated in bottles to the same temperature originally applied, and then it will keep clear in well closed bottles for several years.

Following is in outline the process used in the manufacture of wine from grapes:

Previous to their being pressed the ripe grapes must be bruised with a wooden pestle or in some other manner. For white wine the pulp is pressed immediately; for red wine it is loosely covered in vats until the color has been extracted from the skins. Instead of a wine press some prefer to use a centrifugal machine for separating the juice.

Fermentation is carried on at various temperatures. Must fermented at from 59° to 68° F. yields a wine strong in alcohol, but deficient in bouquet, while if conducted at from 41° to 59° F. it will be poor in alcohol but of richer bouquet. The fermentation is carried on either in open wooden vats or in barrels the bungholes of which are left open. Opinions differ as to whether air should be admitted or not. However, aeration hastens the process. If the air is to be excluded during fermentation the carbon dioxide evolved is carried off through a tube in the bung which is bent twice, the outer end dipping into a vessel with water. According to conditions the process of fermentation last from two to three days, or even four to six weeks. The progress of fermentation is estimated by taking the specific gravity, which naturally decreases.

One crude method of fermenting fruit juice of any kind

consists in almost filling a barrel laid on its side and allowing the scum to run out of the bunghole, the waste being made up and the barrel kept full by adding from time to time a little more must.

When the fermentation is over the wine is run into another absolutely clean cask previously thoroughly sulphured. Wines strong enough with alcohol and hence not prone to acetous fermentation, are sometimes allowed to remain in the fermenting vat until clear. The casks must be filled to the bunghole. A second but less active fermentation takes place later on, whereby the yeast and some tartar are deposited at the bottom. This second process should go on at a low temperature (5° to 10° C.) and should extend over three to six months. The second fermentation over, the casks are filled to the bungholes and closed air-tight, or the wine is drawn into fresh casks or bottled. If necessary, the wine is clarified by the addition of a littleisinglass dissolved in water.

ANTIMORPHINE is a specialty, which, according to Hefelmann, is a solution of disodium phosphate. (Ph. Rundschau.)

NAPHTHOL SOAP FOR DANDRUFF.—100 parts of soft soap are liquefied at a low heat, 50 parts of alcohol and 15 parts of glycerine added, the mixture filtered and 3 parts of beta-naphthol dissolved in the filtrate. The preparation is used in the same manner as ordinary soft soap. (Ap. Ztg.)

QUININE SULPHOCREOSOTATE is a preparation containing 50 per cent. of quinine and is used as an antiseptic. It is in yellow shining scales, which are easily soluble in water and insoluble in alcohol. Ammonia precipitates quinine from the solution, ferrous salts throw down a dark-violet precipitate. The solution is stable and has a bitter taste, suggestive of smoke. The maximum daily dose is given as 1 Gm. (15 grains). (Ztsch. f. Pharm.)

PILLS OF CREOSOTE, GUAIACOL, OIL OF TURPENTINE and similar substances are easily and quickly prepared, according to Agostini, in the following manner: The substance to be made into pills is vigorously shaken with an equal quantity of water, until a kind of emulsion is formed. To this mixture the requisite quantity of powdered licorice root is added and a mass formed, which does not harden, as is the case with pills made with magnesia as excipient. (Ztsch. f. Pharm.)

BISMUTH OXY-IODIDE, which replaces bismuth subnitrate in internal medication and iodoform in surgery, may be prepared in the following manner as an always uniform product. Bismuth subnitrate (306 p.) is dissolved in pure nitric acid (300 p.), the solution diluted with water until it begins to get turbid and mixed with a warm solution of potassium iodide (165.6 p.) in water (2,300 p.). A brown precipitate is formed, which becomes somewhat lighter on washing. The washed salt is dried at a low temperature. (Ph. Post.)

DETECTION OF FORMALDEHYDE.—Prof. Vitali has found that a moderately concentrated solution of phenylhydrazine, added to a solution containing formaldehyde, causes a fine precipitate, in appearance similar to precipitated sulphur. It is thrown down either at once or after some time, depending on the quantity of formaldehyde present. On warming, the liquid becomes yellow, later reddish-yellow. This change in color takes place also without warming, but more slowly. The reaction will detect 0.00001 p. c. of formaldehyde. (Ph. Post.)

VALERYDINE is the result of a reaction between phenacetine and valeric acid. It is claimed to combine the antipyretic and antineuralgic action of the phenacetine with the calming effect of valeric acid. It is in the form of brilliant, needle-shaped crystals, melting at 129° C., soluble in alcohol, chloroform and acetone, sparingly in ether, and insoluble in water. Valerydine is stated to be a specific for various nervous affections, such as nervous headache, neuralgia, hysteria, etc., in doses of 0.5 to 1 Gm. (5 to 15 grains) daily. (ra. Rundschau.)

THE PHARMACEUTICAL ERA

[WEEKLY]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XX.

NEW YORK, SEPTEMBER 8, 1908.

No. 10.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL 305	Patented Drugs Must Be
CORRESPONDENCE 307	Stamped 333
ERA COURSE IN PHAR-	Bay Rum Soap Is Taxable;
MAC Y. 309	Harlem Druggists An-
Official Pharmaceutical	nnoyed by Thieves; Retail
Preparations 309	Druggists Remiss in
Pharmaceutical Latin 311	Stamping Goods 334
AMERICAN PHARMA-	Disastrous Fire in Drug
CEUTICAL ASSOCIA-	House; Look Out for This
TION: Full Proceedings	Swindler; Pretended to
Forty-sixth Annual Meet-	be a Prominent Drug-
ing, Baltimore, Aug. 29—	gist 334
Sept. 3. 313-332	Express Companies Must
Flint Glass Bottle Com-	Do the Stamping. 336
bination 332	NEWS LETTERS 336
NEWS AND TRADE DE-	BUSINESS RECORD 339
PARTMENT 333	STATE OF TRADE. 339
	MARKET REPORTS 340

AN OPPORTUNITY FOR TRADE EXTENSION.

The druggist has been repeatedly told of the profit and pleasure to be derived from making and selling those articles in the drug and chemical line which find use in the household or in the workshop. But the advice or instruction for making these things is not so freely offered. This deficiency in the situation is most admirably filled by The Era Formulary. Of its 5,000 formulas, over 1,500 are for the class of articles referred to. These include a great variety of formulas for cleaning preparations, insecticides, vermin poisons, disinfectants, antiseptics, dyes, cements, glues, pastes, mucilages, pyrotechnics, leather dressings, paints, varnishes, stains, soda syrups, inks, polishes, etc., etc. These are articles which people use every day and they do not always buy them of the druggist. The latter should have this trade, because he is peculiarly competent to make the articles, and they are so naturally related to drugs and chemicals as to constitute a most legitimate side line. The Era Formulary will furnish the druggist an incentive and a guide for working up such a business. The book is sent postpaid upon receipt of \$5.00.

Address,

The Pharmaceutical Era, Box 1483, New York.

NOTICE TO ERA COURSE STUDENTS.

The first two lectures of the Junior Course will appear next week, the week following two more lectures of the Senior Course, and so on. This alternation of junior and senior lectures will afford each student two weeks' time in which to prepare his recitations, and will be continued until after the expiration of the heated term, when the work of both classes will be increased.

The questions, recitation blanks and students' outfits are now being prepared and will be forwarded at an early date.

The matriculation books will be kept open for a while longer, and intending students should make early application for admittance to the class.

All students who have sent in their examination papers upon the work of the junior year are eligible to the senior class, upon filing their application, and payment of the regular fee. Junior students who have not completed the first year's work, or who have not yet sent in their examination papers, will be admitted to the senior class with the understanding that they pass their junior examinations next Spring, before taking the final examination in the Senior Course.

Graduates in Medicine and Pharmacy, students who have completed at least one year's work at a college of medicine or pharmacy, and Registered Pharmacists will be admitted to the senior class without examination. From other applicants for admission to the senior class there will be exacted an examination or other evidence of their ability to follow the work intelligently and successfully.

Students are admitted to the junior class without an entrance examination.

The A. Ph. A. Meeting.

A considerable portion of this number is devoted to a report of the proceedings of the American Pharmaceutical Association at its annual meeting in Baltimore just concluded. A portion of this report was published last week, and the more interesting and valuable of the many papers read will appear subsequently.

It is hard in a few general remarks to give an adequate idea of the nature of the meeting and the character of work accomplished. It may be said, however, that most importance attached to the transactions of the section on Education and Legislation. The papers and reports read to this section evidenced a widespread and general growing interest in the matter of pharmaceutical education, and there was hardly a dissentient note against the claim that better and higher, more general and systematic education of the pharmacist was rapidly becoming a necessity. The colleges of pharmacy are raising their standards, boards of pharmacy are more stringent in their examinations, and it may be said without fear of successful contradiction that young men entering the calling to-day are better qualified, at least in theoretical pharmacy, than at any time in previous periods. While advocating and upholding the higher education of pharmacists there has come at the same time a wider

recognition of the value of practical experience, and the greatest apostles of theory are the warmest supporters of practice. Instead of divorce between these, there is coming about a still closer union than ever before.

There has been a reconciliation of the warring factions concerning the recognition of college diplomas by boards of pharmacy. The professors and the colleges do not now insist that their graduates should be registered without examination, but they do ask that no candidate be eligible for examination unless he is the possessor of a college education, and on this ground the boards of pharmacy appear quite willing to meet them. All that appears to be wanted is that the applicant for registration should demonstrate that he possesses knowledge equivalent to that imparted by the college of pharmacy, and this, to our thinking, is a wise and safe provision.

The Scientific Section had the usual number of interesting papers, perhaps a little more interesting than usual. The Commercial Section attracted a good deal of attention, and the chairman seemed to meet with good success. The experiment of putting an arch cutter in the chair has been watched with interest, and Mr. Jacobs' re-election was at once a compliment to him and a proof that he had fulfilled the duties of his position—a very difficult one under the circumstances—with credit and satisfaction.

In conjunction with the various sections, and independently, the general sessions brought into prominence many matters of interest, and important action was taken. There was the usual number of whereases, but it is believed that important results will grow from the deliberations of this Forty-Sixth Annual Session of the American Pharmaceutical Association. We commend the very extensive account in this issue to the careful perusal of all pharmacists who realize that their most vital interests are confided to the care and protection of this national organization.

The Tax on Proprietary Chemicals.

In our news pages this week is the announcement that the U. S. Commissioner of Internal Revenue, through the various collectors, proposes that the stamp tax law shall be rigidly observed, and he threatens severe action against a class of manufacturers and dealers who, in his judgment, have been intentionally and wilfully violating this law. This class, or rather the class of articles they handle, is represented by such patented and trade-marked chemicals as phenacetine, sulphonal, and the like. Dealers in these articles claim exemption from the tax on the ground that the products are "uncompounded" chemicals. There is quite a little feeling displayed, not only in this section, but in the various trade centers of the country where the pronouncement of the Commissioner has been promulgated.

This quibbling over the term "uncompounded" is hair-splitting of the most ridiculous nature. If there are any articles on earth to which the stamp tax should apply it is those which receive from our Government the protection of a patent on process and product, and a trade mark on name. This is the highest type of the proprietary medicine, and we believe that manufacturers and owners of this class of remedies have assumed a wrong position in their opposition to the tax. Phenacetine has been a very mine of wealth to its owners. It is protected by the most stringent regulations, and is the closest corporation in the way of a proprietary article one can imagine. It and the whole horde of other protected synthetics can best afford to pay the tax, and are those upon which the tax could best be assessed. Aside from being strictly proprietary in their nature,

they are farther eligible to tax through being put up in a form similar to proprietary articles, and, farther still, distinct medicinal claims are made for them. They would seem to be subject to the tax on every ground mentioned in the regulations. The quibbling over "uncompounded" is absurd. The claim that compounding means mixing with other substances is ridiculous. We cannot see how in common judgment the Commissioner could take any other stand than he has; nor can we believe that if the matter is brought to settlement in the Courts the objectors will have left a single leg of reason to stand upon.

Reforming Pharmacy by Law.

The address of the chairman of the Section on Legislation and Education, delivered at the Baltimore meeting, should have the effect of correcting considerable misapprehension which exists within pharmacy as to the true scope of pharmacy laws. The mistaken idea that pharmacy laws are intended for the benefit of pharmacists, and only incidentally of the public, is, however, quite a natural one. The action and sentiment which have preceded such enactments have all apparently had their beginning in the pharmaceutical body. What is more natural than for many within that body, to say nothing of the outsider with his superficial observation, to jump to the conclusion that pharmacy laws are measures intended to aid the pharmacist? When there is thought of that peculiar political institution, the lobby, and the fact is recalled that pharmacy must borrow its methods, it is rather difficult for the public to differentiate. Who ever heard of a lobby advocating legislative restrictions and police regulations for itself?

Dispensing with this method of securing legislation is not suggested, but there is necessity for modification of its manner. United effort and surcease of growling at legislative bodies will secure desirable legislation if it is for the public good. And if there is anything in the theory that what is good for the public is good for the pharmacist, the wisdom of pharmacy will unite in asking for that kind of laws.

Pharmacy cannot be reformed by law and made remunerative for its practitioners. Its reform, or rather its re-adjustment, must come, we are told, through remedies "based upon natural and economic laws." This is about the only answer that can be given to the pharmaceutical "whither and wherefore." We would be compelled to give that answer ourselves, and then hurry off for fear of other provoking questions, mumbling something about "the survival of the fittest," and repeating the easy answer of Malthus. We cannot advise the druggist in his study of natural and economic laws. There is a continual row and clamor from the camp of the political economists. Their "plans" for regenerating the human lump are as plentiful as those for solving the "cut-rate" problem, and we might add in a whisper, quite as effective. We do not know whether the druggist needs a course of reading in Adam Smith, John Stuart Mill and the physiocrats. Perhaps he will do better without sorting this old lumber, and merely stand as an observer working over his own stock of common sense, and figuring with what calmness he may command, those "tendencies" which are so well described in all respects save that of their final outcome.

Because of the large amount of space necessarily devoted to the proceedings of the American Pharmaceutical Association, the usual news letters in this number are considerably abbreviated. News matter of the most importance, however, is not sacrificed, though in many instances material abridgement has been necessary.

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

DR PIERCE ANSWERED.

Bellefontaine, O., August 30, 1898.

To the Editor.—It is rather amusing, if nothing more, to read in your last issue the three or four column article of a prominent patent medicine manufacturer.

In his frantic endeavor to pacify what he calls "Our friends the retailers," he compasses sea and land for reasons to explain why this is thus. He says he pays his share of the war tax by stamping his checks, etc. So do his friends. Inference from his article is that the consumer must pay the tax, whereas, he makes it so the retailer cannot get the tax from the consumer, by printing the selling price of his pills on the package. So we cannot, if we were so disposed, charge more than 25 cents, price printed on label. This same package of pills may cost the manufacturer 5 cents, yet he says his profits were so small that he had to fall back on "Our friends the retailers," and not only make them pay this tax, but 2 per cent. more for the privilege.

Great shades of our forefathers! What are we coming to? And such friendship as will stand such abuse is not worth preserving. Paying the tax on the stock on hand, and now this advance, is a burden that will cause some to fall, and is not only unjust but unwise on the part of manufacturers, for it will destroy friendship.

To spend "hundreds of thousands of dollars" to establish a medicine, and then antagonize the retailer, who commands the very last station, who can, and very likely will nullify all that this expenditure has produced, looks like the height of folly to

A. C. WALLACE.

Seymour, Ind., August 29, 1898.

To the Editor.—The retail druggist is hard hit again, and, as usual, from a source from which he should naturally expect the best treatment, but from which, oddly as it may seem, he has been getting it in the neck so long as the memory of man runneth. And now he is tired of it all; this endless raising of prices and continual nagging and accusations of dishonest business methods, substituting and everything else that is vile. His anger is aroused, and unless he allows it to cool too quickly a great many manufacturers of patent medicines will emerge from the combat with not even their "honor" left them. Methods have been suggested for combating this latest outrage; the placing on their products of a label bearing a Spanish flag has been urged. That would have been very well at that time, but the war is over. Spain has preserved all that she is supposed to have fought for, her honor. Our soldiers respected her flag, and it must not be said that we retail druggists have disgraced it by putting it upon the products of these manufacturers. More appropriate would be a label bearing a picture of Columbia gazing sadly on the American flag being torn and trampled, and saying, "The people who made this preparation refuse to contribute their just part toward defending my flag." A simple explanation from the druggist would do the rest. The most effective fighting is done through organization. When all the druggists in your town, city or county can agree upon any line of action, you will accomplish something. But it must be unanimous. One black sheep in the lot will spoil it all. If we work together we can use the boycott. We can and must refuse to renew newspaper advertising contracts. We will soon receive blank contracts with a request to purchase a few dozen "Tired Feeling Remedies," and get a supply of calendars free. Throw all such "blank" requests into the waste basket. Should their salesman on his next trip seem inclined to criticize your business methods, throw him into the cellar. You have sufficient provocation for such action.

Certain manufacturers have intimated that they will find other means of reaching the people besides through the retail druggist. Let us, by all means, encourage

them in this idea, but, should they make the attempt, they will be made to realize that, while we are now reluctantly handing out their products, with an apology to our customers for selling the goods of such unparitric people, they will, if their aural appendage is of the size usually worn by the species in which we druggists have classed them, easily hear the dull thud of the preparations as they seek their deserved resting place from the back doors of the forty thousand drug stores of our country. C. W. M.

Telford, Tenn., August 30, 1898.

To the Editor.—After a careful perusal of Dr. Pierce's letter in a recent issue of the Era, in which he pleads his case with the zeal and speciousness of an agile attorney, we arrive at the conclusion that he is "touched" by the protest from Indiana.

Well, he may be. The "touching" process will become more acute when he discovers that his Favorite R and Golden Medical Discovery are fast disappearing from the orders of the retailer.

Dr. Pierce frankly tells us that all taxes fall upon the consumer. It is refreshing to get this reliable definition of taxation from such a respectable source. We cannot hear it too often. It is in conformity with the teachings of political economy. It is the prevailing doctrine in the South.

But the definition is foreign to the matter at issue. The tax on Dr. Pierce's medicines cannot be shifted to the consumer. It matters not what be the intent of the law—about which our Buffalo friend talks with interesting versatility—it matters not what be the intent of Dr. Pierce; there is no distributing this "burden fairly and equitably among the public at large."

Not only the tax, but Dr. Pierce's margin as well, must fall on the retailer, who is powerless to collect either from the consumer. Is this equity? The enterprising gentleman of Golden Discovery fame must not obscure the real question with a glittering essay on political economy. Is he prepared to cast the whole burden on the retailer, his constant ally along the road to success and fortune? And is he prepared to excuse all by talking about "trade conditions, etc.?"

Our eminent philanthropist tells us that he contemplated an advance price list before the war tax was even embryonic. This is easily said. Any one who has gone beyond the war limit could say as much. It is a nice thing to say. Some fertile brain might suggest that it is another favorite prescription for a certain trade disorder now prevalent among certain manufacturers of patents and proprietaries, who, as an incident of the war, are seeking to tax more than the war, knowing at the same time that the retailer must bear the brunt. If we may heed information coming to us from commercial agencies and other sources somewhat reliable, the gentleman from Buffalo has not suffered in the past because of meagre profits derived from the sale of his nostrums. He has preached but a part of the true gospel of taxation. All that he has preached is theoretically true, true in the refined abstract, but there is something more to be said. There is a growing disposition to tax wealth, to place some of the burden on robust prosperity, on the theory that by so doing the demands of a true equity will not be outraged.

In conclusion, let us say that to advance the price to cover the tax, thus shelving almost the whole burden on the retailer, is an outrage, a shameful display of ingratitude.

To advance the price beyond the war limit is the above compounded and a piece of impudence that the retailer should plaster over with effective contempt.

F. S. B.

A BIT OF POLICY.

New York, August 25, 1898.

To the Editor.—In this age of competition and the motto of "every one for himself and the devil take the hindmost," a bit of a different policy, embracing the American motto of "live and let live," would be rather unique, but it would eventually revert to the benefit of many, if not all, the owners of proprietary articles.

I have before me a circular sent to druggists by Mr. Andreas Saxlehner, which may serve as an exemplary

illustration. In it he speaks of the litigations against the Eisner & Mendelsohn Co., assuring us druggists at the same time that the litigations are not over as yet, and that, reading between the lines, many more thousands of dollars will be spent on lawyers, courts and all such expensive luxuries, in fighting a concern whose business principles are no worse nor better than those of the fighter. The circular concludes by saying, "We shall duly notify you of the outcome of this controversy. In the meantime you will remain on the safe side by handling only our Hunyadi Janos water." Here is the rub! The safe side for the druggist! Is it the safe side to be compelled to sell a staple article like Hunyadi water at 25 cents per bottle, the cost of which is 23½ cents? Is it safe for the druggist, his wife and children?

Suppose the money wasted on lawyers be turned into channels for mutual benefit! Suppose you owners of proprietary articles tear off the mask of "injured interests," and put on a straight face bearing the true expression of human feeling. Acting upon the suggestion, the first thing our friend in question would do, would be to lower the price of Hunyadi Janos to, say, \$1.75 per dozen, and have the druggist and himself, as well, on the Safe Side.

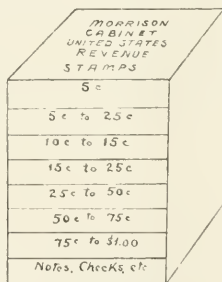
D. KANTOR.

A CABINET FOR REVENUE STAMPS.

Shelbyville, Ind., August 28, 1898.

To the Editor.—As you are always on the alert for something of value and interest to your patrons, you will pardon a suggestion. The new revenue law calls for stamps of a number of different denominations, and it has been an annoyance to keep run of them—that is, to keep them in some convenient shape. The thought struck me, and I made a crude cabinet of some 5 x 7 plate boxes on the plan shown by accompanying sketch, which can be made cheaply by some paper box house. Section with drawers, which I have found very convenient, occupying little space, and placing stamps so as to be gotten at quickly. If you can use the idea to any advantage by way of an offering to subscribers, all right; if not, no harm done. If desired and preferred, druggists can make it themselves.

CHAS. MORRISON.



THE LIMITATION OF COLLEGES.

Philadelphia, August 30, 1898.

To the Editor.—I have observed in the Chicago Items of the Pharmaceutical Era of the 25th of August some comments and queries upon the subject of the administration of colleges of pharmacy in the United States. In which it is assumed that the writer of the article quoted seeks to establish a partial or ungenerous discrimination in favor of the institutions which would be excepted, in a process of elimination there proposed. On the contrary, he would have all institutions which are made to conform to the standard indicated, and as many only, numerically, as are deemed to be essential to the present educational facility and requirements, reserved. This reservation and number would include such, only, as are now or may become either in the actual personal control of retail pharmacists in business, or removed from a dominating government by teachers and professional instructors. There exists an earnest desire which is wholly compatible with just and reasonable demand, that all those interests of pharmacy which are affected directly or indirectly by adverse causes should now be made subservient to the principles of wise policy and sagacious expediency. We want only those who will appreciate the vital, though material, concerns of pharmacy, to give direction and government to those concerns, and we want to restrain and avoid the further

committal of influence from the hands of those who cannot have an instructive appreciation.

The question was asked, how this eliminative process should be executed? The writer has no other plan to propose than that which springs from a resolution based upon consent and guided by the wisdom of common sense.

Yours truly,
WILLIAM B. THOMPSON.

HE WINS THE GOLD MEDAL.

Salt Lake City, Utah, August 25, 1898.

To the Pharmaceutical Era:

The announcement of my winning the Warner Gold Medal was awaiting me upon my return from a trip in the mountains and I must acknowledge that I was very agreeably surprised.

I have taken a great deal of interest in the course, and feel that I have been amply repaid for the time spent in study, without considering the medal which arrived yesterday and is appreciated very highly and will be an incentive to study and advancement so I shall feel that I am worthy to wear it.

Thanking you for the congratulations you extend to me, and in return hoping the success of the course of study you have arranged for the druggists will be a greater success the second year than the first, which was a grand success,

I remain, yours truly.

AMOS C. COPE.

WINNER OF THE PHARMACEUTICAL BALANCE.

Kentlworth, Inn, Baltimore, N. C.

To the Pharmaceutical Era:

Owing to illness I was unable to answer your announcement and acknowledge the receipt of the prize awarded me. I must confess that both came as a very pleasant surprise. I think it only just to add that I have been very much benefited by this course, and am sure that it must have proved a great help to many others. I wish you all success.

Mrs. LEO. ROSENBLUM.

U. S. DISPENSATORY.

San Jose, Cal., August 15, 1898.

The Pharmaceutical Era:

I received the Dispensatory from the Lippincott Co. in good condition and feel quite highly honored by the fact that out of such a large class I should be one of the winners. Will try to do better next year and in the meantime I am doing all I can to increase the number of students. I consider the lectures on Chemistry to be worth more than the price of the two year course. Wishing you the greatest success, I remain,

Yours respectfully

E. E. MAGEE,
No. 33 S. Second street.

EUDERMOL IN THE TREATMENT OF SCABIES.—Eudermol, which is chemically nicotine salicylate, has been used by Prof. Wolters with great success in the treatment of scabies. In the form of a 0.1 per cent. ointment. After a preliminary soap bath a single application of the ointment is sufficient to stop the itching completely and permanently. To make absolutely sure, it is advisable to make four successive applications of the ointment, but the second time usually effects a permanent cure. The ointment does not irritate, as is the case with naphthol, naphthalin, Vlemminck's solution and Wilkinson's ointment; it does not cause albuminuria, as tar and naphthalin do under some circumstances; it has no toxic effects, as nicotiana-soap; and has the advantage over Peru balsam of being comparatively odorless. Eudermol is readily soluble in water and most organic solvents, and has a feeble empyreumatic odor. (Ap. Ztg.)

A LYPH FOR RELIEVING TOOTHACHE.—Prof. Klein has prepared a lymph from microbes, whose action is said to be most remarkable. Its application to an aching tooth is claimed to relieve the pain immediately. The nerve-pulp of the tooth is not killed and the tooth itself is even strengthened. (Ph. Post.)

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Ph.D.
Virgil Cohlentz, A.M., Ph.D.
Wilber G. Compher, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heebner, Ph.M.B., Ph.G.
George B. Kauffman, B.Sc., Ph.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G., Ph.D.
Edward Kremers, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.
CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison, F.C.S.
Oscar Olders, Ph.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. L. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M., M.D.
Henry H. Rushy, M.D.
Samuel P. Sadler, Ph.D.
L. E. Sayre, B.Sc., Ph.M.
Wilbur L. Seville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wulling, Ph.G., Ph.M.D.

IMPORTANT.

Students of the Era Course are requested to carefully read the "Notice to Era Students" on the first editorial page of this issue.

SENIOR COURSE. LECTURE No. 1.

Official Pharmaceutical Preparations.

By Official Pharmaceutical Preparations are meant the medicinal and other compounds and mixtures for whose manufacture the Pharmacopœia prescribes a definite working formula, excluding such preparations as are merely purifications, concentrations or dilutions of other official substances.

In this sense the term pharmaceutical preparation is practically synonymous with the term *galenic*, which is applied to such medicinal compositions as are prepared by physical means as distinguished from those produced by chemical processes. The term *galenic* is commemorative of the Greek physician Galen, of the second century, who introduced a number of preparations of this character into medical practice.

While the pharmacist may handle a large number of purely chemical substances, the manufacture and dispensing of galenicals have always constituted and doubtless always will constitute, an important part of his employment. It is, in fact, this portion of his calling which distinguishes him from the "chemist," pure and simple.

CLASSIFICATION OF OFFICIAL PREPARATIONS.

The number and importance of the official galenicals render some sort of a classification indispensable, in order to permit of their proper comprehension by the student. Such a classification is possible only in a broad and general way, since on account of their heterogeneous character, no hard and fast lines can be drawn, and no division into groups has ever been made that has not been more or less fanciful, or which has not to a greater or less extent offended against the canons of philosophical classification.

In the classification adopted herein, while fair accuracy of statement has been sought, the principal object kept in mind has been the convenience of the student. While it has been endeavored to make the classification logically consistent, yet this principle has not been permitted to stand in the way where its strict observance might obscure any portion of the subject. Accordingly, when in the discussion of any of the various groups of preparations, it has been found convenient to lay aside one principle of classification and take up another, the exchange has been made without hesitancy and without apology.

While a knowledge of working formulas is of great importance to the practical pharmacist, the student should take notice that the main purpose of these lectures

is not to teach formulas. These can be found in the Pharmacopœia, when needed. In so far as they are given here, they are cast into popular descriptive form, and are merely for the purpose of acquainting the student with the general character of the preparations which they represent. The mere committing to memory of recipes, whether official or unofficial, is a very unprofitable exercise, and requires time and energy which might be better spent in a consideration of general principles.

SUMMARY OF OFFICIAL PREPARATIONS.

According to their physical state, the preparations of the Pharmacopœia are divisible into two great branches, Liquids and Solids.

LIQUID PREPARATIONS.

Classified according to the character of the menstruum or principal solvent employed in their manufacture, the official liquid preparations may be divided into six tolerably distinct groups. Each of these groups except the last, may in turn be divided into two or more classes, which are recognized by distinct names.

Group I. Aqueous Preparations.

Including all liquid preparations whose menstruum or principal solvent is water.

Waters, Solutions, Syrups, Honeys, Mucilages, Mixtures, Emulsions, Infusions and Decoctions.

Group II. Alcoholic Preparations.

Including all liquid preparations whose menstruum or principal solvent is alcoholic in character.

Spirits, Elixirs, Tinctures, Wines and Fluid Extracts.

Group III. Ethereal Preparations.

Including all liquid preparations whose menstruum or principal solvent is ethereal.

Colloids and Oleoresins.

Group IV. Oleaceous Preparations.

Including all liquid preparations whose menstruum or principal solvent is a fixed or volatile oil or oleic acid. Liniments and Oleates.

Group V. Acetous Preparations.

Including all liquid preparations whose menstruum or principal solvent is diluted acetic acid. Vinegars.

Group VI. Glycerin Preparations.

Including all liquid preparations whose menstruum or principal solvent is glycerin. Glycerites.

Note.—Some of the oleoresins, liniments and glycerites may approach a semi-solid consistence.

SOLID PREPARATIONS.

The solid preparations of the Pharmacopœia are most conveniently divided into four principal groups, according to their physical characters when in the finished condition.

Group I. Solids in Powder Form.

Including the Resins, Powders and Triturations.

Group II. Soft Solids or Semi-Solids.

Mostly of Plular Consistence.

Including the Extracts, Masses, Confections, Cerates and Ointments.

Group III. Spread on Cloth, Leather or Paper.

Including the Plasters and Papers.

Group IV. Moulded or Formed Solids.

Divided Into Masses of Uniform Shape and Size.

Including the Pills, Troches and Suppositories.

LIQUID OFFICIAL GALENICALS.

Group I. Aqueous Preparations.

AQUÆ. The Medicated Waters.

Within the meaning of the Pharmacopœia a Medicated Water is an aqueous solution of a volatile substance.

Under the class *Aqua* the Pharmacopœia also includes two forms of unmedicated water, specifying in each case the tests for purity with which the article must comply. These two forms of water are known respectively as *Aqua* and *Aqua Destillata*.

Aqua.

This is defined as Natural Water in its purest attainable state. It is required to be colorless, tasteless and odorless, either cold or boiling. It must be neutral to litmus paper, must not be colored by hydrogen or ammonium sulfid, and must not yield more than 0.5 Gm. of solid residue when a liter is evaporated to dryness. Ammonia compounds, chlorids, nitrates and sulfates must not be present in excess of certain prescribed limits, and the amount of allowable organic matter must not be sufficient to completely decolorize 100 Cc of the water when acidulated with sulfuric acid, colored with potassium permanganate and boiled for ten minutes.

It is this quality of water which is to be used when the Pharmacopœia prescribes water without specifying the distilled article. Only the best variety of rain or spring waters will, as a rule, comply with the official tests.

In all cases where the available natural water is open to doubt, and in prescription work, distilled water should always be used.

Aqua Destillata.—Distilled Water.

The distilled water of the Pharmacopœia is directed to be made by taking 1,000 volumes of natural water and distilling with an apparatus provided with a block tin or glass condenser. The first 100 volumes, containing the volatile impurities, and the last 100 volumes, containing the mineral and solid impurities, are to be thrown away, and the intervening 800 volumes are to be collected and preserved.

The prescribed tests should show it to be entirely free from solid and other impurities, and the permanganate test should not show the presence of oxidizable matters after standing for ten hours.

The water obtained from the condensed steam of a steam engine, frequently used by pharmacists, is always contaminated by the lubricating oil of the cylinder and is unfit for pharmaceutical purposes. A good quality of natural water is far better. Considering the ease with which the pharmacist may supply himself with an abundance of pure distilled water, his neglect to do so is inexcusable.

The Medicated Waters.

The medicated waters are seventeen in number, and for convenience may be divided into two sub-classes, as follows:

- (1) *Solutions of Volatile Organic Substances.*
- (2) *Solutions of Volatile Inorganic Substances.*

1. SOLUTIONS OF VOLATILE ORGANIC SUBSTANCES.

These are thirteen in number. Ten are solutions of

volatile oils; one of a stearopten, and two of organic compounds not volatile oils.

The method of manufacture varies with the nature of the substance, and may be either by simple admixture and solution, by percolation through an absorbent powder saturated with the medicating substance, by distillation and by dilution of a stronger water.

A. Made by Distillation.

Aqua Aurantii Florum Fortior.—Stronger or Triple Orange Flower Water. Saturated Solution.

Aqua Rosæ Fortior.—Stronger or Triple Rose Water. Saturated Solution.

These are never prepared by the pharmacist, but are produced as by-products in the distillation of the volatile oils of orange flowers and rose. They are required to be saturated solutions of their respective oils.

They should be clear, colorless and free from mucilaginous matters and metallic impurities. They are to be preserved in a dark place, rose water in well stoppered and orange flower water in loosely stoppered bottles.

B. Prepared by Dilution of a Stronger Water.

Aqua Aurantii Florum.—Orange Flower Water.

Aqua Rosæ.—Rose Water.

These two waters are merely dilutions of the two preceding, made by mixing one volume of the stronger water with one volume of distilled water.

C. Prepared by Simple Solution.

The waters prepared by simple solution of the medicating substance in distilled water are three in number.

Aqua Amygdali Amaræ.—Bitter Almond Water. 0.1 per cent.

Aqua Creosoti.—Creosote Water. 1 per cent.

Aqua Chloroformi.—Chloroform Water. Saturated Solution.

The manipulation in each of these preparations is extremely simple, consisting in the addition of the substance to the distilled water, agitating, and, except in the case of chloroform water, filtering through a well wetted filter. The bitter almond water contains one cubic centimeter Bitter Oil of Almonds to 990 of distilled water; the creosote water, 10 cubic centimeters Creosote to 990 of distilled water, while chloroform water is a saturated solution with an excess of undissolved Chloroform in the bottle. The latter preparation is also to be preserved in dark, amber colored bottles.

D. Prepared by Triturating the Oil with Absorbent Powder and Water, and Filtering.

The waters prepared in this manner are six in number, five of them from volatile oils and one from a stearopten.

From Volatile Oils.

Aqua Anisi.—Anise Water. 0.2 per cent.

Aqua Cinnamon.—Cinnamon Water. 0.2 per cent.

Aqua Fœniculi.—Fennel Water. 0.2 per cent.

Aqua Menthe Piperitæ.—Peppermint Water. 0.2 per cent.

Aqua Menthe Viridis.—Spear-mint Water. 0.2 per cent.

From a Stearopten.

Aqua Camphoræ.—Camphor Water. 0.8 per cent.

The five waters containing volatile oils have a uniform strength of 0.2 per cent., and are prepared by triturating 2 Cc of the oil and 4 Gm Precipitated Calcium Phosphate with the distilled water, gradually added, and filtering.

The camphor water has a strength of 0.8 per cent., and is prepared by triturating 8 Gm Camphor with 5 Cc Alcohol, 5 Gm Precipitated Calcium Phosphate, and with the water gradually added, and filtering.

The office of the calcium phosphate is to enable a minute division of the oil to be made, thereby greatly increasing the surface exposed to the water and promoting its solution.

Magnesium Carbonate and Purified Cotton, prescribed in previous editions of the Pharmacopœia, have both been abandoned, the first because sufficient passed into solution to frequently react injuriously with substances dissolved in the water, as salts of the alkalis, and the second because it failed to give satisfactory results in the hands of the average operator.

2. WATERS CONTAINING INORGANIC SUBSTANCES.

The members of this division are four in number, the

first three containing gaseous substances, and the fourth a liquid. They are:

Aqua Ammoniac.—Ammonia Water. 10 per cent.

Aqua Ammoniac Fortior.—Stronger Ammonia Water. 28 per cent.

Aqua Chlorin.—Chlorin Water. 0.4 per cent.

Aqua Hydrogenii Dioxid.—Water of Hydrogen Dioxid. 3 per cent.

The last two should be prepared by the pharmacist; the first two are always purchased from the manufacturer or wholesaler.

Ammonia Water and Stronger Ammonia Water are never prepared by the pharmacist. The first should contain 10 and the second 28 per cent. by weight of ammonia gas, NH_3 . When this gas dissolves in water, ammonium hydroxid, NH_4OH , is assumed to be formed, but as the existence of this compound is doubtful, the official waters for all practical purposes may be regarded as mere aqueous solutions of NH_3 .

The "household ammonia" of the shops is a solution of variable strength, and usually of indifferent purity.

The official liquids are required to be free from empyreuma, or smoky odor, when neutralized by an acid, and from organic and metallic impurities when subjected to the official tests.

Both have the suffocating and caustic odor and taste of ammonia, and are poisonous if taken internally in concentrated form. The weaker solution is used in Ammonia Liniment, Aromatic Spirit of Ammonia, as a reagent, and as a precipitant in the manufacture of various pharmaceuticals. The stronger water is used in Spirit of Ammonia, and in preparing the weaker liquid by dilution with water.

To avoid accidents from a sudden release of gas from the stronger liquid, it is well to remember the proverbial

caution to "keep in a cool place, and never open the bottle when at all warm."

Chloria Water is a saturated solution containing 0.4 per cent. by weight of the gas. It is prepared by generating chlorine by the action of hydrochloric acid on manganese dioxide, with the aid of heat, passing the gas first through a small amount of water to wash it, and then into cold, distilled water, occasionally agitating the vessel containing the latter, until saturated.

The liquid should be preserved in small, dark, amber-colored, glass-stoppered bottles and in a cool place.

This preparation possesses the oxidizing and bleaching effect of chlorine. It is used in pharmacy as a reagent, and in medicine as a disinfectant and germicide. Internally it acts as an irritant poison when taken in large doses and undiluted.

On keeping, even when preserved from the light, it gradually deteriorates, the chlorine uniting with the hydrogen of the water to form hydrochloric acid, and releasing oxygen.

Solution of Hydrogen Dioxid is an aqueous solution containing about 3 per cent. by weight of absolute hydrogen dioxide, H_2O_2 , corresponding to about 10 volumes of available oxygen. It is prepared by decomposing barium hydroxid with phosphoric acid, removing the excess of barium by means of sulfuric acid, assaying by means of volumetric solution of potassium permanganate, and diluting to the proper strength.

The official solution is colorless, odorless, and has an acidulous taste from the slight excess of acid purposely left present in order to aid in its preservation.

Hydrogen dioxide is an efficient disinfectant and germicide, which properties it owes to the readiness with which it gives up oxygen to oxidizable substances. One of its popular uses is that of a hair bleach.

SENIOR COURSE, LECTURE No. 2.

Pharmaceutical Latin.

BY PROF. WILBER G. COMPTON, A.M., PH.D.

In the preparation of these lessons for the use of those who are studying pharmacy, we deem no particular introduction necessary, as we believe the students who are pursuing this course are fully aware of the value to them of a knowledge of the language in which the name of every drug in the Pharmacopœia is written, and of the fact that Latin is the language of science throughout the civilized world, and that no one can lay claim to the title of scientist who does not understand its language.

True it is that many have been successful in the drug business, many have succeeded as physicians and in all the numerous ramifications leading from the study of pharmacy, who have not had a knowledge of Latin, or at least but a smattering of the language, but even these will testify that their work would have been better and that they would have ranked higher had their knowledge of the language of their profession been greater.

The principles of the language are few and simple, and can be mastered by the average student in a short time, and as the terms are in daily use and the names are constantly before him on the bottles, there is no reason why the Latin should not be as familiar to the pharmacist as his mother tongue; indeed, we know of no class of persons who have so excellent an opportunity of mastering the language if they so desire.

However, for the needs of the pharmacist, it is not necessary that he be able to read the classic authors, such as Cicero, Horace or Virgil, or to write long compositions in Latin; the field that claims his attention is a comparatively limited one, but that one should be thoroughly mastered.

It is taken for granted that the student is familiar with the rules governing the construction of his own language; the use of nouns and pronouns; the agreement of verbs; the use of prepositions and conjunctions, etc., and if this be true, he will find that the Latin syntax is in a very large measure the same as the English, or rather that the English is largely indebted to the Latin for its forms.

The Alphabet.—The Latin alphabet is the same as the English, except that it has no "w," and that the letters "j" and "i" are, to a certain extent, interchangeable, especially at the beginning of words, as the word "jam" may be written either "jam" or "iam."

The division into vowels and consonants is the same as in English. The diphthongs, or the combinations formed by uniting two vowels, which are then sounded as one, are "ae, oe, au, ei, eu, ui."

Pronunciation.—In this country there are two accepted methods of Latin pronunciation, the Roman and the English. The Roman method is supposed to approximate the pronunciation of the ancient Latin. In this method every letter has always the same sound. The simple vowels are long or short; a short vowel has the same sound as the corresponding long vowel, but occupies only half as much time in utterance.

Sounds of the Vowels.

LONG.

a as in father.
e as in they.
i as in machine.
o as in tone.
u as in rude.

SHORT.

a as in dogma.
e as in set.
i as in sit.
o as in obey.
u as in full.

y has the sound of the French u. It may be given as a long or short i.

Sounds of Diphthongs.

ae as ai in aisle.
oe as oi in coin.
au as ou in owl.

ei as ei in eight.
eo as eo in few.
ui as ui in we.

Sounds of Consonants.

c is always hard, as in can.
j is like y, as y in yet.
t is always like t in time.
qu is like qu in quart.
th is like th in their.
bs and bt are like ps and pt.
gu and su when united with the following vowel, like gic and sic.

g is always hard, as in gun.
s is sharp, as in sea.
v is like w in we.
ch has the sound of k.
ph is like f.

The other consonants are sounded as they are in English.

The English Method.—By this method, which is the one in common use, the letters have the same sound as in English, and the Latin words are pronounced according to the rules of English pronunciation; but note carefully that every Latin word has as many syllables as it has vowels and diphthongs. For example, the English words *gate*, *store*, *cape*, *uisd*, would be pronounced as if written *ga-te*, *sto-re*, *ca-pe* and *ais-le*.

The following is to be observed in this method, viz.: *ea* at the end of a word is pronounced like the word *case*; *us* at the end of the plural like *use* in the word *door*; *ch* is always like *k*; *c* and *g* are soft before *e*, *ae*, *ai*, *en*, *i* and *y*.

Accent.—The rules for the accent are as follows:

1. In words of two syllables, the accent is *always* on the penult or first syllable: as, *al-ba*, *bae-ca*.

2. In words of three or more syllables, the penult, if long, is accented; if short or common, the ante-penult is accented: as, *vi-bar-num*, *stra-ti-um*.

Note.—The penult is the last syllable but one; the antepenult, the syllable before the penult.

Exercises.—Accent the following words according to the above rules: *alba*, *arnica*, *bacca*, *belladonna*, *jalapa*, *cimicifuga*, *pillula*, *sanguinaria*, *ammonium*, *balsamum*.

Parts of Speech.—The parts of speech in Latin are the noun, pronoun, adjective, verb, adverb, preposition, conjunction and interjection.

These have the uses as in English, but the nouns, pronouns, adjectives, verbs and adverbs have marked changes to denote the different relations they may sustain to each other and to the sentences, as a whole, in which they may be found.

Nouns.—The modifications of nouns are Gender, Person, Number and Case.

Gender.—There are three Genders: Masculine, Feminine and Neuter. The following are Masculine: Names of *males*, *rivers*, *islands* and *months*. The following are Feminine: Names of *females*, *countries*, *towns*, *islands* and *trees*. The following are Neuter: Nouns that are indeclinable, other parts of speech, sentences and phrases when used as nouns, and the products of trees.

The student will note the fact that there is no common gender, and that many words such as the names of rivers, towns, trees, etc., which in English are classed as neuter, are given Masculine or Feminine Genders in the Latin.

Person.—There are three persons as in the English.

Number.—The number of nouns is the same as in English.

Case.—In Latin a noun may have six different forms to express its relation to other words; the forms are called *cases*. They are the Nominative, Genitive, Dative, Accusative, Vocative and Ablative.

The Nominative corresponds to the English Nominative.

The Genitive is equivalent to the English Possessive; as, The *man's* coat; or, represents the Objective case of

a noun after the preposition *of*; as, The lock *of the door*.

The Dative is usually translated by the objective case after the preposition *to* or *for*; to the doctor, for the patient.

The Accusative is object of a transitive verb; as, *He has the pencil*. It is also used after many prepositions.

The Vocative is the case of address; as, *Oh, doctor*.

The Ablative is usually translated by the objective case after the preposition *from*, *by*, *with*, *in* or *at*.

The cases are distinguished from each other by certain endings, which will be explained under declensions.

Declension.—Declension is the modification which nouns undergo to mark their relation to other words in the sentence.

The Latin has five Declensions, distinguished by the endings of the Genitive singular, or, when used only in the plural, by the ending of the Genitive plural.

These endings are as follows:

Declension	I	II	III	IV	V
Genitive Singular	<i>a</i>	<i>i</i>	<i>is</i>	<i>us</i>	<i>ei</i>
Genitive Plural	<i>arum</i>	<i>orum</i>	<i>um</i> or <i>lun</i>	<i>um</i>	<i>eum</i>

These endings should be memorized so that they can be recognized at a glance, because all Latin vocabularies give the Nominative Singular and the Genitive ending, and from these the student is expected to determine the Declension of the word. For example: You will find in your dictionary the word *manus*, *-ae*; this indicates that the word is of the 1st Declension.

The Latin being no longer a spoken language, its forms are fixed and invariable, and not subject to change as are those of a living, spoken language. The English is a language of *position*; the Latin of *inflection*. The position of a word in English determines, in most cases its government or relation to other words; as "The good girl has a red rose."

In this sentence the position of the word *girl* shows that it is the subject of the sentence, hence in the Nominative case, as the position of *rose* shows it to be the object of the verb. Likewise the position of the other words in the sentence shows their relations.

But in the following sentence in the Latin, "Puella bona rosam rubram habet," the endings or inflections of the words show their relation. *Puella* has the Nominative singular ending; hence is taken as the subject *rosam* has the ending of the Accusative, hence must be the objective case, object of the verb. In like manner, the ending of *bona* shows its agreement with *puella*, and the ending of *rubram* indicates its relation to *rosam*. There can be no mistake in these cases, as the form fully shows the relation; but arrange an English sentence in such a way, as "A wise man the great general slew," and there is nothing to indicate which is subject, which is object. We cannot say, so far as arrangement and form are concerned, whether "the wise man slew the great general" or "the great general slew the wise man."

We believe the above examples will make plain the difference between the construction as to form, of English and Latin sentences, and emphasize the necessity of a thorough knowledge of Latin Inflections.

SYNTHETIC ANALGESICS.—Professor Ralph Stockman read a paper on these remedies at the British Medical Association's meeting. Chemist and Druggist reports it thus: He said no member of the group acted in an ideal way, either in reducing temperature or relieving pain. The drawbacks and dangers had been exaggerated; still, none of them was without more or less serious drawbacks for general and frequent use in practice. All were closely allied to phenol and anilin, the toxicity of these two bodies being chemically modified, and their analgesic action increased. Graphic formulae showed the close chemical relationship of these bodies. Phenol in ordinary doses has little effect on the blood or nervous system; the toxicity of salicylic acid in ordinary doses was negligible. Anilin, however, was dangerous in its medicinal use, its action on blood causing cyanosis and dyspnea. Phenylhydrazin caused thrombosis in vessels, and was a strong poison. Pyroline was impossible as a therapeutic agent. All had the same kind of action on the grey matter of the spinal cord—conduction of painful impressions and perception in the grey matter of the brain were lessened. To these actions the analgesic effect was

due. Because of the absence of their action on the motor-centers the person could go about on business. Analgesic drugs which have destructive action on the hemoglobin should be rejected. Professor Stockman said he had given up acetanilid, because of its action on the blood, and because of the small range of its dose. Antipyrin was safer, and phenacetin equally powerful and attended by much less danger. Tals he regards as the safest and best of the synthetic analgesics. He had never seen the slightest degree of faintness or unpleasant result. Lactophenin, which is practically identical in composition is as safe. Antithermin is distinctly poisonous, and should be avoided.

AMMONIATED ACETANILID.—The following mixture has been recommended as causing less depression than acetanilid alone: Acetanilid 25 p., ammonium carbonate 10 p., sodium bicarbonate 3 p., sugar of milk 60 p. It stimulates the heart and the vaso-motor system and is used in dysmenorrhoea, gastralgia, hyperacidity of the stomach and atonic dyspepsia. (Zisch, f. Ph.)

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
 Emil L. Boerner, Ph.D.
 Virgil Coblenz, A.M., Ph.D.
 Wilber G. Compher, A.M., Ph.G.
 D. M. R. Culbreth, M.D.
 Albert E. Ebert, Ph.M., Ph.D.
 E. E. Ewell, Ph.C.
 James M. Good, Ph.G., M.D.
 Arthur L. Green, M.D., Ph.D.
 Charles F. Heebner, Ph.M., Ph.G.
 George B. Kaufman, B.Sc., Ph.D.
 E. J. Kennedy, Ph.C.
 Henry Kraemer, Ph.G., Ph.D.
 Edward Kremers, Ph.G., Ph.D.
 John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.

CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
 Joseph E. Morrison.
 Oscar Goldberg, Ph.D.
 George F. Payne, Ph.G., M.D.
 Edgar L. Patch, Ph.G.
 T. D. Reed, M.D., C.M.
 Edsel A. Ruddiman, Ph.M., M.D.
 Henry H. Rusby, M.D.
 Samuel P. Sadtler, Ph.D.
 L. E. Sayre, B.Sc., Ph.M.
 Wilbur L. Scoville, Ph.G.
 William Simon, Ph.D., M.D.
 F. E. Stewart, M.D., Ph.G.
 Julius W. Sturmer, Ph.G.
 Frederick J. Wulling, Ph.G., Ph.M.D.

JUNIOR COURSE. LECTURE No. 1.

Inorganic Chemistry.

Introductory.

Chemistry, Chemical and Physical Change.—

Chemistry is the science which treats of the composition of substances and of the changes of composition which they undergo. It differs from Physics in that the latter deals with the properties and motions of bodies without regard to their composition, while chemistry considers the properties and motions of bodies in relation to their composition. The two sciences are, however, closely related to each other, since chemical changes are always accompanied by physical effects, while physical phenomena frequently give rise to chemical activity.

In general, that may be termed a physical change which causes some alteration in the position, form or condition of a body without affecting its *identity*, as the heating, bending or magnetizing of a piece of iron, the melting of ice etc., and as a chemical change, one which does occasion some alteration in *identity*, as in the rusting of iron, its solution in an acid, or the decomposition of water into its constituents.

Chemistry concerns itself mainly with the character of the matter before and after an energy change; physics considers chiefly the energy involved in the transformation.

Organic and Inorganic Chemistry.—It is common to divide chemistry into two branches, Inorganic and Organic. This division is based upon the view formerly held that the compounds formed by the tissues of organized beings were essentially different from those which could be produced artificially, hence the name Organic Chemistry for the branch which treated of the former products, while the branch which treated of artificially formed substances and of those of mineral origin was known as Inorganic Chemistry. This distinction, however, has long since been broken down, and large numbers of so-called organic compounds are constantly being artificially prepared. Since these are either carbon compounds or derivatives of the latter, the subject is more accurately described as the "Chemistry of the Carbon Compounds." Owing to the great number of these, they are better treated separately, so that the old division into organic and inorganic chemistry, rightly understood, is still of service.

Elements and Compounds.—A majority of the substances found in nature may be separated into two or more constituents, as Galena, which may be separated into Lead and Sulfur; Salt, which can be divided into the metal Sodium and the gas Chlorine, etc. The substances which are made up of two or more constituents chemically united are known as *Compounds*; while those constituents which resist all efforts at further division are known as *Elements*. About seventy elementary substances are now enumerated by chemists. All other

remaining substances must be viewed as compounds or mixtures of the elements. It is not improbable that many or all of the substances now recognized as elements are themselves compounds of still simpler substances.

Physical Mixtures.—A compound in the chemical sense must be carefully distinguished from a mere physical mixture, as a mixture of iron filings and powdered sulfur. From such a combination the iron can be removed by means of a magnet, or the sulfur dissolved out by carbon disulfide. If, however, the mixture in proper proportions be first subjected to a sufficiently high temperature, evidences of chemical action will appear, the sulfur will disappear as sulfur and the iron as iron, and in their place will be found an entirely new substance, neither attracted by the magnet nor soluble in carbon disulfide. In the first case, there was no true union of the constituents, but a promiscuous mingling without definite order, or proportion. In the second case, element was united to element, in definite order and in fixed proportions.

Characteristics of Chemical Change.—From the preceding it will be seen that the chief characteristic of chemical change is the alteration in the properties of substances between which it occurs. Old properties are lost and new ones are gained, while the identity of the constituents is merged into that of the compound which they enter. Other indications of chemical action are temperature changes, as the evolution of light or heat, change of state, as from solid to liquid, or the reverse, and especially the fixed numerical proportions of the substances concerned in the action.

Varieties of Chemical Change.—Among the numerous varieties of chemical action, there are three classes which are of especial importance.

The first is where a compound is broken up into its constituents, as mercuric oxide into mercury and oxygen. Such a reaction is known as *Analysis*, which also includes the separation of a complex compound into simpler ones.

The second class is the reverse of the first, as the combination of hydrogen and oxygen to form water. This is known as *Synthesis*, and would include the formation of more complex compounds from simpler ones.

The third class is where both analysis and synthesis occur together, as in the action of sulfuric acid on common salt, when both the old substances disappear, and two new ones, hydrochloric acid and sodium sulfate, are brought into existence. This kind of change is sometimes distinguished by the term *Metathesis*.

QUANTITATIVE CHARACTER OF CHEMICAL ACTION.

There are three important quantitative laws governing chemical action, which must be thoroughly understood

before the peculiar character of what is implied by a chemical charge can be properly comprehended. These are Laws of Conservation of Mass, and of Definite and Multiple Proportions.

Conservation of Mass.—The sum of the products of a chemical action is always equal to the sum of the factors concerned in the reaction. No matter how the reaction may be brought about, or what may be the magnitude of the body involved, there will be neither more nor less matter after the reaction than before.

Law of Definite Proportions.—One of the most striking facts in chemistry is that of constancy of composition. Whatever may be the origin of a compound, whether occurring naturally or prepared artificially, careful analysis shows that it always contains the same elements in the same proportions by weight and volume. If by any means these proportions are altered, either by adding to or taking away from its constituents, a new compound is formed, possessing new properties. This is expressed in the Law of Definite Proportions, which is "That the same compound always contains the same elements combined in the same proportions by weight."

Law of Multiple Proportions.—Frequently it is found that two elements are capable of combining in more than one proportion. When this occurs, the several weights of the elements whose proportions vary bear a simple ratio to each other, or the higher proportions are simple multiples of the lesser ones. For example, there is known a series of compounds of nitrogen with oxygen, in which, conceiving the amount of nitrogen to be 28 parts in each compound, there will be 16 parts of oxygen in the first, 32 parts in the second, 48 parts in the third, 64 parts in the fourth and 80 parts in the fifth. In each case, the increase of oxygen is 16 parts, with no intermediate proportions.

This law may be stated as follows: When two elements, A and B, combine in more than one proportion, then the several proportions of B which combine with a fixed proportion of A bear a simple ratio to each other.

MATTER MOLECULAR AND ATOMIC.

Molecules.—For reasons which are considered elsewhere, it is believed that matter is not infinitely divisible, but that if a substance, either elementary or compound, be broken up into smaller and smaller pieces, we would at length come to particles of definite size and shape which could not be further divided without destroying the character of the substance and causing a change of properties. These smallest particles are known as Molecules, and may be defined as the smallest particles of a substance which can exhibit the properties of that substance, or as the smallest particles of a substance that can exist in the free state. Every substance is to be considered as an aggregation of molecules, all of which are alike in structure and properties.

Atoms.—The chemist, however, has reasons for believing that particles exist of still smaller size than molecules. If in the preceding illustration, common salt had been considered as the substance taken, when the molecule had been arrived at there would have been reached the smallest particle which could exhibit the properties of common salt. If it were possible by chemical means to divide this molecule, the result would have been, not two pieces of salt, but a metal called sodium and another substance known as chlorine. Since there is no known method whereby these last particles can be still farther broken up, it is assumed that the limit of divisibility has been reached. These smallest particles are known as Atoms. The meaning of the word atom is that which cannot be cut, or that which is indivisible.

The chemist cannot, of course, deal with a single molecule, much less with a single atom, but he can deal with masses of them, and by deduction arrive at the properties of single molecules or of single atoms.

Distinctions Between Atoms and Molecules.

Atoms are believed to be generally incapable of existing in the free state. When one combination is broken up they immediately enter another, either with atoms of their own or of a different kind. When atoms of different kinds are united, the result is a *compound molecule*. When atoms of the same kind are united, the result is an *elementary molecule*.

Elementary molecules usually contain two atoms, but may contain more. In a few instances, it is supposed

that elementary molecules consist of single atoms, or that with such elements the atom and molecule are identical. Compound molecules must, of course, always contain at least two atoms, and may consist of many.

Molecules, except when they consist of but a single atom, are divisible; atoms are indivisible.

Valence.—As has been seen, compound molecules are formed by the union of two or more atoms. Since by the law of constant proportions, a given compound always contains the same elements in the same proportions, it follows that their molecules must always contain the same number of the same kind of atoms.

Atoms differ greatly in their ability to combine with each other. Some atoms can hold only one atom of another kind in combination, while others can hold two, three, four or five, etc. The extent of an atom's combining power for other atoms is known as its *Valence*.

As the standard for measuring the combining power of different atoms, the combining power of *Hydrogen* has been selected.

Atoms which can hold one hydrogen atom or its equivalent in combination are known as *univalent*. If they can combine with two hydrogen atoms they are *bivalent*. If they can combine with three, four, five, six or seven atoms, they are known as *trivalent*, *quadrivalent*, *quintivalent*, *sextivalent* or *septivalent*.

Univalent atoms are also known as *monads*, bivalent atoms as *dyads*, and trivalent as *triads*. In like manner the names *tetrad*, *pentad*, *hexad* and *heptad* indicate quadrivalent, quintivalent, sextivalent and septivalent atoms respectively.

Bonds.—Valence is also sometimes expressed by the word *bond*, the atom being considered to have as many bonds as it has units of valence. A dyad has two, a triad three, bonds, etc. Bonds are sometimes exhibited graphically by means of dashes attached to the symbols of the atom, as $\text{C}^{\text{---}}$, meaning that the carbon atom has four bonds, or is quadrivalent, etc.

Another method of indicating valence is by attaching indices, or small Roman numerals, at the upper right hand corner of the symbol, as C^{IV} or C^{IV} .

There are no free bonds in compounds, i. e., one atom will not combine with another unless all of its bonds are neutralized or satisfied by an equal number of bonds of the other element.

Variable Valence.—While atoms always have the same valence in the same compound, they may have different valences in different compounds. This necessarily follows from the law of multiple proportions. If two elements can combine in more than one proportion, it is evident their atoms must at different times have different combining powers.

When the valence of an atom varies, it usually changes from odd to odd or from even to even. For example, the valences of chlorine are 1, 3, 5 and 7, and of sulfur, 2, 4 and 6, etc.

Terminations -ous and -ic.—To distinguish between compounds in which elements have different valences, the terminations *-ous* and *-ic* are employed, the former indicating the lower and the latter the higher valence. In mercurous, ferrous, stannous and other compounds ending in *-ous*, the metal has its lower valence, while in mercuric, ferric, stannic and other *-ic* compounds, the metal has a higher valence.

Atomic Weights.—Though it may not be possible to determine the actual weight of atoms, it is possible to determine their relative weights, or their weights as compared with each other. Thus it is known that the nitrogen atom is fourteen times as heavy as the hydrogen atom, the oxygen atom sixteen times as heavy, and so on. These numbers are therefore known as atomic weights. Hydrogen, having the lightest known atom, is taken as the unit, and is known as the *Microarith*.

The student must distinguish between atomic weight and valence, since the weight of an atom has little or nothing to do with its combining power.

Notation of Atoms.—For convenience and brevity, and as an aid to accuracy, atoms are represented by *Symbols*. A symbol is usually the initial letter of the name of the element, as H for hydrogen, N for nitrogen, S for sulfur. When this method would give several elements the same symbol, a second letter is added, as

Ni for nickel, Se for selenium, etc. Sometimes the symbol is derived from the Latin name of the element, as Ag for silver, the Latin name for which is *Argentum*, Cu for copper, from the Latin *Cuprum*, etc.

It should be noted that the symbol represents one atom only of an element. A symbol of one letter is always a capital. If it consists of two letters, the first is a capital and the second a small letter.

JUNIOR COURSE. LECTURE NO. 2.

Pharmaceutical Physics.

Introductory.

Physics or Natural Philosophy.—Originally the term Physics, or "Natural Philosophy," was understood in practically the same sense as the modern term "Natural Science," and embraced the study of nature in all of its departments. With the increase in knowledge concerning the different classes of natural objects and of natural phenomena, it became necessary to make a sub-division of so vast a subject, and so the departments of Biology, Chemistry, Astronomy, Geology, Physiology, etc., have been split off one by one, and have themselves attained to the dignity of separate sciences. What was left over from this sub-division of the old natural philosophy constitutes the present science of Physics, and is best defined in terms of its subject matter as the "science of matter and energy."

Relation to Other Sciences.—Though studied as separate branches, the several subjects named above are by no means independent of physics. In conjunction with chemistry, physics forms the basis upon which every other department of natural science rests; while between physics and chemistry, the connection is so close that it is often difficult to determine where the province of one ends or that of the other begins. Perhaps the best distinction is that while chemistry is mainly concerned with the change in properties caused by chemical action, physics is concerned only with the transferences and transformations of energy, without regard to any changes in properties which may be produced thereby. While every chemical action involves a physical change, many physical changes are entirely independent of chemical phenomena.

Pharmaceutical Physics.—By the term Pharmaceutical Physics is not meant a new kind of physics, but a study of natural philosophy in its relation to the theory and art of pharmacy. Such physical laws and phenomena as are of especial importance in pharmacy will be emphasized, and their pharmaceutical applications pointed out; such departments of general physics as have but little or no connection with pharmacy will be touched upon lightly or passed over without mention.

Matter.—If we trace up any of the phenomena which come into consciousness through the bodily senses, we shall find them always closely associated with something which is called Matter. For this reason, matter has been defined as "anything that is perceived by the senses," but this definition is open to the objection that such things as light, heat and electricity, though perceptible to the senses, are certainly not kinds of matter. For this reason it is perhaps better to define matter in terms of its properties.

Among the various properties displayed by matter, those of gravitation and dimension are especially prominent. No portion of matter has ever been discovered that is not subject to gravitative attraction nor can we conceive of a kind of matter which would not occupy space. We therefore assume that gravitation and extension are universal and essential properties, and define matter as that which occupies space and exhibits gravitative attraction.

Mass, Substance, Body.—As these three terms will be frequently employed in the subsequent lectures, it is important that the student should have a clear understanding of their meaning. Mass refers to the quantity of matter which a body contains, without regard to its size or form. The term Substance is used to designate some particular kind of matter, and possessed of definite qualities, as iron, clay, wood, stone, etc. A Body is a definite portion of matter, as a coin, a lump of coal or a piece of chalk.

Motion.—The above consideration of matter is without regard to its position in space, or its condition as to

rest or motion. A body is at rest when it does not change its position, and in motion when it does change its position.

Since there is no portion of matter in the universe which is either absolutely at rest or in motion with regard to all other portions of matter, the terms rest and motion are relative merely, and become intelligible only when understood to refer to some specific point in space. A passenger on a boat is at rest as compared with the boat, and in motion with relation to the banks of the stream.

Force, Energy and Work.—A portion of matter which is in motion will exert a pull upon anything to which it is attached, or a push upon any object placed in its path. This pull or push is denominated Force, and may also exist between bodies at rest, as the force of gravitation, the attraction of a magnet, and the like.

If the body pushed or pulled upon is set in motion thereby, Work is done upon it, and the pulling or pushing body will lose some of its own motion. This capacity which one body has to do work upon another is called Energy.

The essence of work is the transfer of energy, or the production of motion against resistance. Neither the exertion of force without the production of motion, nor motion without resistance is work. If a man should pull upon a boat fast at anchor without moving it, this would be the exertion of force, but not the doing of work upon the boat. If, however, the pull should produce motion, this would be a transfer of energy from the man to the boat and the production of work.

To recapitulate: Force is a tendency to produce or modify motion, and is in the nature of a push or a pull. Force is not energy, but the sign or manifestation of energy, i. e., the pressure exerted by energy.

Work is the production of motion against resistance, or the transfer of energy from one body to another. The energy or motion gained by the body worked upon is lost by the body which does the work.

Energy is the capacity to perform work, or to set bodies in motion against resistance. It is no force, but that which exerts force.

Measurement of Force, Energy and Work.—A force is measured by the momentum it produces in a given period of time. Momentum is the quantity of motion which a body possesses, and is found by multiplying the mass of a moving body by its velocity. If the mass (M) be 10 pounds, and the velocity (V) be 5 feet per second, the momentum will be $10 \times 5 = 50$. There is no recognized name for the unit of momentum.

Work and energy are measured by multiplying the resistance overcome into the space through which it is overcome. For practical purposes, the unit may be either the Foot-Pound or the Kilogrammeter.

The foot-pound is the work done in moving a body through a space of one foot against a resistance of one pound. The kilogrammeter is the work done in moving a body through the space of one meter against a resistance of one kilogram. If a body weighing 10 pounds be lifted 10 feet from the earth, then the work done is $10 \times 10 = 100$ foot pounds.

If in this example kilograms and meters are substituted for pounds and feet, the product will be 100 kilogrammeters, instead of foot-pounds.

Absolute Units.—In purely scientific investigations another set of units, known as Absolute Units, are used in the measurement of force, energy and work. They are also known as Centimeter-Gram-Second, or C. G. S. units, because derived from the centimeter, gram and second.

The absolute unit of force is the *Dyne*. It is that amount

of force which, acting for one second, will impart to a mass of one gram a velocity of one centimeter per second.

The absolute unit for work and energy is the *Erg*. "An *erg* is the work done, or the energy imparted, by a force of one dyne working through a distance of one centimeter."

Kinetic and Potential Energy.—As has already been stated, a body in motion possesses energy, and is capable of doing work. The energy which it has in consequence of its motion, as a moving car, is denominated Kinetic energy, from *kinco*, to move. Under certain conditions, bodies at rest may also be capable of doing work. For example, a car at the top of a steep grade is capable of doing work when the brakes are loosed. So a clock weight, or a spring under tension, if released, may each perform work. These are examples of energy due to position, or *stored-up energy*. Such energy is known as Potential, and exists by virtue of an equivalent amount of work previously bestowed upon the body which possesses the advantage of position. The energies of gunpowder, dynamite, etc., are examples of potential energy.

Conservation of Energy.—Perhaps the most important and far-reaching generalization in physical science since the enunciation of the law of gravitation by Newton is what is known as the Law of the Conservation of Energy. Stated broadly, this law is, That the total amount of energy in the universe is a fixed quantity which can neither be added to nor diminished by any process known to science, and that all varieties of energy are so related to each other that energy of any one kind may be converted into energy of any other kind.

Constitution of Matter.—Though our studies may not yet have prepared the student for the comprehension of any very elaborate theories, it may nevertheless be of benefit to know something of the opinions which scientists at present entertain concerning the structure of what we call matter.

From a careful study of the phenomena of diffusion, the behavior of matter under the influence of changes in temperature and pressure, and of other observed reactions which need not be mentioned here, physicists have arrived at the following conclusions:

(1) Matter is not continuous, or "solid" throughout, but discontinuous, and made up of small particles separated from each other by relatively large spaces. For convenience, these particles are called *Molecules*, which means literally, *little masses*.

(2) It is in consequence of this porous or molecular structure of matter that solids can be compressed, that a gas like hydrogen can pass through a metal like platinum, or water through iron; that liquids like alcohol and water contract in bulk when mixed, etc., etc.

(3) These particles are not at rest, but are incessantly quivering or vibrating in the free spaces between them.

(4) Because of this motion, the particles collide violently, and tend to drive each other still further apart.

(5) The rate of motion, or the velocity of the particles, is determined by the amount of heat present.

(6) The range of motion, or the distance which a particle may travel without striking against another, depends upon the number of particles in a given space. The denser the body, the shorter the distance, or the shorter their average free path.

It is estimated that air particles at the earth's surface have an average free path of more than two hundred times their own diameters. If the air particles were magnified to the size of the base ball, the average free path of each molecule would lie in the neighborhood of 40 feet.

(7) In consequence of the increase in the range of motion, bodies expand with the addition of heat and contract with its withdrawal.

The student who considers this theory of matter for the first time will probably regard it as extravagantly absurd. The object of presenting it here is not that he may receive it as a finality, but that he may understand the many references which are subsequently made to it in the text.

Number and Size of Molecules.—Some idea of the number and minuteness of molecules may be formed from the estimation that the smallest particle of dust visible under the most powerful microscope, say a cube

to one hundred thousandth of an inch on one side, will probably contain from 60 to 100 millions of them, or from the often quoted estimation by Prof. Crookes that, to count molecules at the rate of ten million per second, it would require 250,000 years to number the molecules in a pin's head.

According to Thompson, we may "regard as a very high degree of probability" that in ordinary solids and liquids, the "mean distance between the centers of contiguous molecules is less than the hundred millionth and greater than the two thousand millionth of a centimeter."

Prof. Tait has estimated that the molecule does not occupy more than 5 per cent. of the space in which it vibrates. If this be correct, then 95 per cent. of the apparent bulk of a body consists of the spaces between its molecules.

The Three States of Matter.—Commonly, matter presents itself in three forms, the Solid, the Liquid and the Gaseous.

A Solid is a body whose form is self-subsistent. If left to itself, it will preserve its shape and size indefinitely. In solids we may understand the range of molecular motion to be rather limited and the effect of cohesion great.

A Liquid is a body so mobile as to take the form of any vessel in which it is placed. When at rest it always has a definite upper surface which is invariably parallel to the horizon, except where it comes into contact with the sides of a vessel, at which point it may be either elevated or depressed. In liquids we may conceive the molecular movement to be somewhat freer than in solids and the cohesion so much lessened that the molecules readily glide over and about each other.

A Gas is a substance which always completely fills every vessel in which it is placed, i. e., when placed in any space it always expands or diffuses into every part of that space, so that it is everywhere equally distributed. A gas never has a distinct upper surface, but always conforms its surfaces to the walls of the vessel in which it is confined.

In gases we may imagine the range of molecular motion to be immensely greater than in either liquids or solids, and the influence of cohesion to be almost nil.

Influence of Heat.—The condition which any portion of matter occupies depends largely upon the amount of heat present. Sufficient heat applied to a solid may so increase the range of molecular motion as to liquefy it or may even cause the liquid to assume the state of vapor.

The Radiant State.—When gases are very highly rarefied as in the so-called Crookes's Tubes, they exhibit properties so greatly different from their ordinary properties that Prof. Crookes has proposed the term *Radian* State to express the nature of matter in this condition.

OPIMUM SMOKING IN INDIA.—In the return of recent correspondence between the Government of India and the Secretary of State in Council (including the reports of the Local Government in India) as to the measures adopted to give effect to the recommendation of the Royal Commission on the subject of the evils connected with opium smoking in India, and the use of rooms as opium smoking saloons, the Government states that steps have been or are being taken in all those provinces in India proper in which shops had formerly been licensed for the sale of opium smoking preparations, for the discontinuance of this practice. It being left to the smokers to manufacture their own preparations, subject to strict limits as to the amount of such preparations they may possess at any one time.

(*Pharm. Jour.*) In Burma alone, where opium smoking, and not eating, is the common habit, the sale of these preparations to non-Burmans and registered Burmans under prescribed regulations and restrictions will not be interfered with. With regard to the question of suppressing opium smoking saloons, the majority of the Local Governments agree in the opinion that it is undesirable at present to undertake penal legislation against opium smoking in saloons and clubs. It is hoped, however, that the recent measures taken by the Government of India against the sale of preparations of opium used for smoking, supplementary as these were to the previous prohibition of smoking on shop premises, will cause so much inconvenience to be attached to the practice of opium smoking that it will gradually fall off.

A. PH. A. PAPERS.

Read at the Baltimore Meeting, Aug. 29-Sept. 3, 1898.

THE SCHOOL OF PRACTICAL EXPERIENCE.

(Written for the Juniors.)

BY E. L. PATCH, BOSTON, MASS.

Much has been said concerning the relation of practical experience to the so-called theoretical school training in preparing for a pharmaceutical career. Not a little of this seems to have been actuated by the prejudice of past methods rather than inspired by observation of present conditions and the lessons of real experience.

The demand is to place pharmacy upon the plane of a pure profession, yet the efforts to give the novice the same thorough preliminary training that the lawyer, the physician and the theologian must have before entering upon their practical experience, is discredited.

To be sure experience is often lauded as the best teacher, but her worth depends upon her lessons and upon the receptivity of her pupil. She is as apt to teach lessons that were better never learned, as to teach those of practical value. Unless they are guided by correct theory, her book had better remain closed. Thousands of young men have experienced the bad effects of acquiring wrong habits of thought and action—have even tasted the bitterness that follows the indulgence in vice or the thwarting of their advancement by yielding to a spirit of indifference and love of ease and pleasure, out how many are taught by the experience to throw off the yoke, assert their manhood and re-win the lost field of struggle.

Is not experience the forger of habit and does not unwise experience hang to one like a ball and chain to a criminal, preventing the restoral of a shattered ideal or the creation of a new one? Is it not better to be thoroughly drilled in correct theory and a habit of observation that will enable one to avoid misleading experience and to move continuously along the way of actual service and real success? Common sense says yes, even if prejudice curls the lip.

As in life, so in pharmacy, there are many experiences at the outset that are calculated to check advance, to so dwarf and belittle the calling in the eyes of the new aspirant as to prevent his rising above the level of his surroundings. How many students have said to me "what is the use of my learning all this, they never need or use it in the store where I am employed?"

Following this question in many cases came a drop to the low level of working for rank only, or the lower one of acquiring that which seemed practical in the narrow vision of the questioner, measured by the boundary of immediate environment; while no word of encouragement could arouse a purpose to store up principles of knowledge, to strengthen the mind and to control action on a higher plane in an unknown future. The same young men, kept from the unfortunate if not erroneous teachings of a narrow practical experience, might have been inspired to strive for the high ideal of a perfect training for an important calling, and under such impulse have acquired a discipline of mind, a steadiness of purpose, a thoroughness of manipulative skill, and a mastery of the right theory on which all legitimate and proper practice is based, that would have permanently fixed their place in the vanguard of their calling, sustained by their increased resourcefulness on each occasion of a new experience.

If unable to locate in a pharmacy free from the blight of prejudice and an unjust public suspicion classing them as dram sellers, drink mixers, petty merchants and panders to the depravity of snuff dippers, morphine users, cocaine victims and ether snuffers, they would not drop to the level an improper public sentiment would consign them to, but would rise so far above it as to prove its falsity, or would step forward into a medical career doubly equipped for successful service.

These preliminary thoughts might be enlarged upon to practical purpose, but enough has been said to convey our thought that correct theory should precede correct practice, and in a rambling sort of way, we will call attention to some experiences which are, and some which are not, practical.

It is good in theory to acquire habits of industry, promptness, neatness, accuracy and politeness, and any young man having an employer who insists rigidly upon their practice, should be grateful for his good fortune.

It is not practical to know the little that is dangerous. Such an attitude leads the clerk to criticize the prescription, to neglect study, and to become over officious. This is illustrated by a recent experience in our city, when a young lady customer calling for a prescription containing copiba, was insulted by the familiar remarks of the clerk. Had he more than the little knowledge that is dangerous, he would have known that copiba is used for chronic dysentery, for hemorrhoids, for chronic bronchitis and other troubles besides that one uppermost in his mind. Lacking this knowledge, his insulting insinuations to a chaste, high-minded and spirited young lady, cost him his situation, and may cost still more in the future.

It is practical to cleanse dishes and apparatus as soon as used, and not permit the formation of hard residues from the evaporation of any remaining liquid; yet how often this is neglected at the cost of much subsequent annoyance and loss of time!

It is not practical to place steel spatulas in the sink after using, often causing them to discolor or rust, impairing their smoothness and their strength. They should be cleaned as soon as used.

Some of these points considered of minor importance may result in large savings in the course of a long experience. As the student listens to his teachers, such suggestions may appear theoretical, but he can convert such theory into practice to great advantage. The relation of the teacher's theory to the student's practice may be illustrated.

The lecturer stated that calcium chloride was a type of deliquescent bodies. The meaning of the term was given and illustrated, and a list supplied of substances belonging to this class. Later on came a classification of the materials called for in pill form, and a classification of excipients, telling what were best absorbents, what best to use as mere diluents, and what to give proper cohesiveness and plasticity. Then came instruction in the theory of pill coating and in the practice of gelatin coating. A prescription is written, calling for seventy-five grains of calcium chloride in sixty salol coated pills. Let me tell you its experience. Druggist number one telephones to every wholesaler in town to ascertain if they have a stock pill of $\frac{1}{4}$ grain of calcium chloride, salol coated, made by any manufacturer. Failing to find such, he returns the prescription to the patient with the information that the article called for cannot be obtained.

Druggist number two, remembering the very deliquescent character of the calcium chloride, informs the customer that the pill will not keep if it is made. The patient, after visiting several stores and becoming about convinced that the specialist he has paid a ten dollar fee to is an ignoramus, at least so far as pharmacy is concerned, stumbles upon a theoretical college boy. As soon as he reads the prescriptions, the three lectures, "Deliquescence, Pill Making and Pill Coating," come to mind. To his 75 grains of calcium chloride, he adds an equal weight of powdered acacia. If it is a damp day he will add two or three drops of water; if a dry day, ten or more. As soon as made he will impale the pills upon the needles of the coating machine, and subsequently dip them in melted salol contained in a short straight tube placed in a water-bath. After dipping sufficiently he will touch the needle holes with a camel-hair brush dipped in the melted salol. He will not melt fifty cents' worth of salol in an open capsule, and placing this capsule in direct contact with flame, decompose the salol. His lecture upon the fusing point, and his classified table, will remind him that salol fuses at the low temperature of 110° F. At once he has re-established the faith of the patient in his physician and convinced him that he should bring his prescriptions to the store where he is employed, if he would save time and annoyance.

It seemed a small matter that the student was told to remove all spicule of glass from a bottle before placing a chemical solution in it; but when several bottles have been returned whose contents were decomposed or precipitated by the roughness of the interior of the bottle, it becomes a practical suggestion. To the student it appeared an over-

refinement of theory to be told to use porcelain shot in removing precipitates, or if lead shot was used, to remove all adhering lead from the surface of the bottle by rinsing with a little nitric acid; but when he has had one or two serious experiences from failure to observe this precaution the theory becomes practical.

The statement that gentian, dandelion and some other drugs contain sugar, and in manipulating them care should be exercised to prevent fermentation, assumes a practical character when the acid in a solid extract has decomposed a pill mass containing it, reflecting upon one's knowledge and skill unfavorably.

The statement that glycerin is hygroscopic assumes practical value when one has compared the keeping qualities of extracts containing it, with those free from it. The possibility of solid extracts containing copper from being made in copper pans, ceases to be a theory after a spatula previously moistened or dipped in acidulated water has been allowed to remain in contact with the extract for a few hours and upon removal found to be coated with copper. The suggestion not to fill shelf bottles too full and to avoid fixing too firmly in place the stoppers of those containing gaseous solutions or volatile liquids, becomes practical after an increase in the atmospheric temperature has caused an expansion of the liquid or a disengagement of gas, resulting in the bursting of the container with damage to the fixtures and the neighboring stock.

The warning not to tightly bottle a prescription in which there is a reaction until such reaction is entirely over, may have been passed by unheeded; but after a cough mixture containing ammonium carbonate and syrup of squill explodes, or one containing fresh spirit of nitrous ether, fluid extract of buchu and fluid extract of uva ursi, or one containing freshly prepared neutral mixture, or one with recently made nitrohydrochloric acid bursts in the hands or pocket of a customer or upon a parlor shelf, care is exercised to prepare such mixtures in a broad shallow vessel, using the extended surface, shallow depth and constant trituration to favor the escape of the generated gas and to guard against their being bottled before the reaction is over.

Do not, as did one, place an ounce of sodium bicarbonate and six drachms of salicylic acid in a mortar and add all at once six ounces of water, then when the mixture effervesced and flowed out of the mortar over the counter, try again by putting similar ingredients in a quart bottle, tying in the stopper, and giving it to another to shake, with the result of an explosion, causing serious loss and damage. Place the solids in a mortar and add the liquid very slowly, controlling the reaction.

The statement that density of precipitation is controlled by density of solution, and that an excess of alkali dissolves many alkaloids and decomposes others, may have had no practical value in the lecture room; but when a 40 per cent. loss is made in separating an alkaloid, or failure is met in assay processes from neglect to take these statements into account, they assume a commercial importance.

But theory and fact must be practically applied. We have known a graduate in pharmacy to condemn a select iodide of sodium and pronounce it bromide. Scrutiny of his method revealed the fact that instead of adding chlorine water to a 5 per cent. solution of the salt and subsequently adding chloroform to obtain a violet-colored solution, he had used a concentrated solution of the salt and an insufficiency of chlorine, and forgetting that the excess of the salt had a stronger affinity for the iodine than the chloroform could exert, read his faint coloration of the chloroform as due to bromine.

Apply the U. S. P. test to potassium iodide, and then add an excess of the salt until it removes the color from the chloroform, you will get my meaning.

The estimation of extractive percentages may have seemed a simple process and an unimportant matter. Yet we have known three operators to differ 20 per cent. in estimating extractive, owing to difference in temperature and thoroughness of extraction, and we have known a customer to be detected in removing 35 per cent. of a shipment of goods, replacing it with water, and returning as defective, the fraud being discovered by taking the extractive percentage and comparing it with that of the same lot as sent out. When by extractive determination

we learn that a fluid extract is only 60 per cent. as strong as a previous lot made from the same drug, it informs us of an error in packing, rate of flow, or too low a temperature, and permits us to correct the defect. It also enables us to discover why some lots of fluid extracts precipitate while others do not. In one instance they are so deficient in soluble extractive as to be free from all liability to deposit.

The lectures on specific gravity may have appeared too moist or too dry to make a favorable impression; but when experience teaches that the application of it may save from two to five dollars on a barrel of alcohol, may prevent the keeping a barrel of witch hazel so deficient in alcohol as to surely spoil, may be a quick method of determining the approximate strength of solutions and the purity of many substances, specific gravity is better appreciated.

The details and principles of color-reactions, precipitation, etc., may interest the student only by their novelty; but if applied to purchased stock, with the result of gaining a positive knowledge of its character and value, with occasional discovery of marked inferiority or accidental substitution, they become practical.

The theoretically trained pharmacist, instead of waiting four or five days for a chemical salt not in stock or readily obtainable of his wholesaler, prepares it from materials at hand. In place of purchasing an ounce of solid extract to dispense a scruple or so upon a stray prescription, he prepares it by evaporation of a suitable fluid extract, or if need be, by exhaustion of the drug and evaporation of the percolate.

The pharmacist well trained in theory is often able to surmount difficulties or explain them away in cases where he has not had previous experience. Hence, while it may be true that the compensation of pharmacy does not give adequate return for a high training, we believe that a thorough college training in the theory of pharmacy and college laboratory practice in its manipulations, may prove of more service to the beginner than the narrow, abortive training received in many stores.

IS HE A COMPETENT PHARMACIST WHO PASSES THE STATE BOARD EXAMINATION AFTER FAILING THREE TIMES?

BY HARRY B. MASON.

In a paper read before the American Pharmaceutical Association at Minnetonka last year, Mr. Henry M. Whitney incidentally stated that of the 110 applicants who had passed during the last year the examination of the Massachusetts Board of Pharmacy, eighteen had passed on their first examination, ten on their second, twenty-eight on their third, twenty-two on their fourth, twelve on their fifth, and so on up until one man had passed on his eighteenth examination. It may seem rash and irresponsible to say that nearly all of those who passed after failing three times, at the most, were incompetent pharmacists—but I firmly believe they were. If an applicant has had proper experience, and has followed, in college or out, a systematic course of study calculated to render him competent, he will surely pass a state board examination that is just and determining on second trial, or at the very farthest, on third trial. The man who gets through on his eighth or eighteenth trial is either he who has finally found an examination that fitted him, one that demanded of him such peculiar bits of knowledge as he had; or he who shrewdly learns the ways of the examination and "crams" to meet them. If this be not so, if it be declared that such men are competent who pass after so many failures, what then is the inference? Why, that a competent man, instead of passing the first or second time, as he ought, has to keep at it until he is lucky enough to get through—which proves something radically wrong with the examination. So it is either the one thing or the other—either an incompetent man is honored, or a competent one abused.

Let us see in detail if this reasoning is fallacious. First, what determines competency? Trained pharmaceutical faculties. Ability to think pharmaceutically—if I may so express it. To make this possible, knowledge must be ab-

sorbed by, and form an integral part of the personality, so that it becomes a part of oneself instead of remaining extraneous and therefore valueless. That is to say, between knowledge and personality there must be chemical union instead of physical contact. Such a transmutation of knowledge (and experience) can only result when it has been received systematically—received in a manner calculated to show the relation of similar parts, and the bond of unity that runs through and connects all. Knowledge heterogeneously gathered will not usually be retained long, for it is extraneous to the reasoning faculties; but even if retained, it is not in a usable form. The mind which holds it is in the condition of a box crammed full of all sorts of scrap-book clippings. The particular one needed can scarcely ever be found, but when found is generally useless because incomplete, and because of the absence of related parts. The scraps are valueless until they are hauled over, sorted, like put to like, and some system and order reached so far as possible. And even then, they would represent incompleteness, for there would be huge crevices between many of them that must be filled before anything like a successful whole could be formed. But while these inanimate scraps can first be gathered chaotically and afterward systematized and given value, knowledge thus gathered by the mind is subject to no such saving process. It must go in right in the first place, for as it goes in so it stays.

If this reasoning be correct, a pharmacist, to be really competent as such, must have followed a more or less systematic course of study, starting with the elements and building up. He must have constructed a treatise of pharmaceutical knowledge all his own, peculiarly his own, and be such master of it, as an integral part of himself, that a fact here and a fact there may be welded together by his reasoning, and applied to purpose. Having done this, he should pass an examination the first time. There may be, however, one or two chapters of his treatise incomplete or missing, one or two flaws in his creation, and these may, more or less justly, cause his defeat. But these would certainly be remedied by the time he took his second examination. If still he fail, and still again upon the third trial, then the examination is a perversion. It requires of him something not material to his competency. It demands of him odds and ends of memorizable facts, which, through lack of use, he has forgotten; or perhaps it sacrifices the sense of proportion in laying undue stress upon some weak point; or it is guilty of some other kind of injustice.

But suppose the competent pharmacist does pass upon his first or second trial. What now is the inference? That those who pass in later trials are incompetent—allowing for a few exceptions, of course. The only point that can be brought against this deduction is that such men are not competent on their early trials, but become so later. Now this is not reasonable in many cases. As I have tried to show in detail, there is, in the main, only one right road to preparation. The man who does not travel this can enter grace by no other way. His only remedy is to go back and get on the right road. How many do this? Very, very few, as I know from a considerable correspondence and acquaintance with applicants. In nine cases out of ten the applicant will travel the road he began on, until it brings him somewhere. If he began as a memorizer of isolated facts, so he continues. If he does not pass his first, or even his second examination, he pays closer attention to the character of the examination and bends all his efforts to preparing especially for it. He lets preparation for the practice of pharmacy go. The examination is his game. He confers with his friends who have been examined, and reaps the benefit of their failures. He memorizes the species of facts that the examination deals in. He smells and tastes of the crude drugs that the examination usually comprises. If he fails now, he is not daunted. He lays to his task with greater zeal. He crams and tastes and smells with renewed vigor, until finally his path leads him to the mossy bank of success after perhaps the fifth, perhaps the fifteenth, examination. Then he proceeds to forget what he has memorized at such cost of scheming effort. Is such a man fit for the practice of pharmacy? Is the public ever to estimate pharmacy in its true importance if such men are sent forth by our boards as competent pharmacists?

Now, by way of explanation, I do not mean to say that

every applicant is incompetent who passes an efficient board examination after having failed three times. But I do mean to say that the great majority are. There will be exceptions, of course. Occasionally an applicant will go back and begin a systematic course of study when he finds that it offers him the only chance of gaining competency. And a few, too, who began their preparation right, but lacked the perseverance and the energy to continue, will renew their activities after two or three failures have taught them the necessity of doing so. But these few cases are out of all proportion to the number given in Mr. Whitney's statistics. For instance, of the 110 men that passed his board last year, only eighteen passed on their first trial; and only twenty-eight on their first and second trials. And after three trials, when certainly almost every competent man should have been passed, 50 per cent. of the whole yet remained to pass on later examinations.

It is a matter of some conjecture which supposition explains so many men passing after repeated failures—whether the competent men are abused, or the incompetent ones honored. But it is evident that neither perversion would exist if the examination were positively determining of competency, for then a man competent would pass early on proving his competency, and a man incompetent would "always and eternally" fail on proving his incompetency. However, while there is a vast need for improvement in the examinations—and I am not speaking personally of the Massachusetts board, having used Mr. Whitney's paper only as a general text—it is asking too much of them to expect that they will inevitably "pluck" the scheming "crammer" who sets himself to learning their ways. Not only, then, should there be made the vital improvements in examinations that are recognized as so necessary, but no applicant should be allowed more than say, three examinations, as Dr. Kremers suggested last year in the discussion of Mr. Whitney's paper.

POISON: ITS LEGAL DEFINITION AND SALE.

F. H. FREERICKS, CINCINNATI, OHIO.

Legislation for pharmacy is at this time receiving general attention from those interested in its advancement, the result of which is evident in several recently enacted or amended pharmacy laws. While these improvements have been limited, as a rule, to requiring better evidence of knowledge and a higher standard of education from applicants for registration, the work of the American Pharmaceutical Association during the last few years indicates how deeply concerned the active and progressive men in pharmacy are regarding its improvement along other lines.

In determining the fitness of applicants desiring to practice pharmacy, the authorities are restricted to examinations, either oral, written, or practical, but after the fitness of the licensee has been established, the next most important function of the law is the regulation of the dispensing and sale of poisons.

The great interest manifested throughout the country in the efforts of your Committee on Legislation has resulted in a general and wide-spread desire to improve upon the poison and label laws.

Clearly and definitely it was proven by the splendidly formulated report of this committee last year that nowhere can there be found a clear and concise definition of the word "poison," positive enough to base a law upon. If it were possible to concisely state what shall constitute a poison, it would be a comparatively easy matter to frame effective laws regulating the sale of such substances.

But since it is impossible, or at least impracticable, to place upon the word "poison" a construction sufficiently broad to be used without hardship and sufficiently limited to be safe, it is evident that if the life and health of the public are not to be grossly endangered, a positive and unequivocal definition of what shall constitute a poison must be promulgated from some authoritative source. The question next arising is, who can best assume the authority to give this definition? In the writer's opinion the proper authority for this purpose is the Revision Committee of the United States Pharmacopoeia. The definition of this committee would at least be national in character, and its provisions would be binding the country over.

State legislation, however much to be lauded, is insufficient; and efforts in that direction, while no doubt often inaugurated by able pharmacists, are subject to the desires and changes of uninformed members of legislative bodies.

If the United States Pharmacopoeia classifies substances to be recognized as poisons, the proper legislation will be within reach in the next few years, as all legislative bodies recognize the Pharmacopoeia as an authority safely to be followed. The foundation for a law just and applicable to all will be furnished, and legislatures will be prompt to act in accordance therewith, and finish that for which the Pharmacopoeia can offer a basis by defining what shall constitute a poison, with proper laws regulating its sale.

Much has been said for and little against the proposition of the adoption of maximum doses in the next issue of the Pharmacopoeia. The opinion now prevails that this will be done, and no doubt such additions will prove of great advantage to physicians and pharmacists alike. If this can be done, why cannot the Pharmacopoeia also state what drugs shall be considered as of dangerous character, based upon the maximum doses in which they may be administered? It can be argued that in the past it has been the distinct desire of the Committee of Revision to recognize only such substances as are of sufficient remedial value to deserve space in the Pharmacopoeia, and that there are a great many substances of poisonous character which have not been found deserving of such distinction. While this is no doubt true, it must be acknowledged that the committee have no need of precedents in order to add to or omit from its scope of usefulness, and if they deem it proper or necessary to separately or collectively define what shall constitute a poison, it certainly lies within their province to do so, whether all substances coming within that ruling are, or have been, otherwise officially recognized or not.

In order to determine more clearly the sense of the preceding lines and to illustrate the idea set forth therein, a rough classification, such as the Pharmacopoeia might adopt, is appended below.

CLASS A.

Hydrocyanic acid, compounds of antimony, arsenic, mercury (except calomel), silver cyanide and sulphocyanide, nitrobenzin, oils of tansy, croton, pennyroyal and savin. Phosphides, phosphorus, wood alcohol, cocaine, chloral, apomorphia, aconite, belladonna, cotton root bark, conium, cantharides, cannabis indica, colchicum, digitalis, duboisia, ergot, fish berries, gelsemium, black and white hellebore, hyoscyamus, ignatia, nuxvomica, opium, poison oak, pilocarpus, physostigma, strophanthus, stramonium, veratrum viride, elaterium and their active principles.

All other drugs and chemicals the maximum dose of which is one decigram or less, as given in standard works on pharmacy.

CLASS B.

Acids, carbolic, hydrochloric, nitric, nitrohydrochloric, conc. phosphoric, oxalic, picric, sulfuric. Aqua ammonia all strengths. Compounds of barium, copper, cobalt, and soluble compounds of lead and zinc. Potassium and sodium hydrates. Bromin, iodine, bitter almonds, creosote, chloroform, ether, essential oils of mustard and bitter almond.

The term compound as applied in Classes A. and B. refers to chemical combinations.

While such an arrangement and definition of all that shall be considered as of poisonous character is not perfect, the writer contends that it is an improvement, and leaves room for severe criticism only in making a dividing line for all such not specially mentioned as those the maximum doses of which are 0.1 Gm. or less. It must be admitted, as a matter of course, that there are some active principles and synthetic compounds, the dose of which is more than 0.1 Gm., that would possibly be considered as dangerous, but on the other hand, these are such that if the limit line would be put at 0.2 or 0.5, some of the most harmless nature would be included.

FORMALIN OINTMENT.—For perspiring of extremities an ointment is recommended consisting of wool-fat 20 parts, petrolatum 10 parts, and solution of formaldehyde 10 to 20 parts. (Ph. Post.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Insolubility of Benzoic Acid in a Prescription.

(G. P. S.) Not all of the benzoic acid is soluble in the following prescription:

Benzoic acid	6 drams
Sodium borate	6 drams
Infusion buchu leaves,	
Infusion uva ursi, of each	8 ounces

The solubility of benzoic acid in water is largely increased by the addition of sodium borate (borax), but in the above prescription there is not enough of this latter salt present. To effect complete solution will require about 1½ ounces of borax. Like all of the mixtures containing infusions, the above will not present a very nice-looking preparation upon standing.

Quinine Urate.

(E. T. M.) The following process is copied from the Fifth Edition of Parrish's "Treatise on Pharmacy": One part freshly precipitated quinine, 1½ of uric acid, and 150 parts of water are to be boiled together in a glass vessel, filtered while hot, the contents of the filter treated with boiling water, and the filtrate mixed and set by in the cold to crystallize. The salt forms as a white granular mass, the mother-liquor yielding a portion by evaporation. When dry it is a white powder, with a feeble lustre, under a microscope showing the form of truncated crystals; soluble in 555 parts of cold water, 1,580 parts of alcohol (sp. gr. 823), or 21.25 parts of ether; it consists of quinine 59.34, uric acid 27.47, water 13.19.

Sewing-Machine Oil.

(C. D.) Sperm oil, to which a little kerosene oil has been added, makes a very satisfactory lubricant for sewing-machines and other light machinery. We also submit the following formulas:

- (1) Soft paraffine 1 part
Paraffine oil 7 parts
Melt the soft paraffine and add the oil. Allow to stand for some hours, and then pour off the liquid.
- (2) Chemical Recipes, an English publication, is authoritative for the following:
Pale oil of almonds 9 ounces
Rectified benzoline 3 ounces
Oil of lavender 1 ounce
Mix and filter.
- (3) Petroleum 3 ounces
Essential oil of almond ½ dram
Pale nut oil 9 ounces
Mix and filter.

Mutton and Beef Suet.

(Adeps.) There is not very much difference between mutton and beef suet. They are both used, however, mutton suet being official in the U. S. Pharmacopoeia. Mutton suet is of a firmer consistence than beef suet, the latter having a lower fusing point (47.5° to 48° C). It is said that mutton suet requires a higher temperature for its fusion than any other animal fat. Either of these substances may be prepared by taking the fat from the vicinity of the kidneys of the sheep or cow, cutting it into small pieces, heating on a waterbath until the fat is quite melted, then straining with expression through flannel. Dieterich recommends adding to the fatty matter in the dish 1-20 its weight of dry sodium sulphate in fine powder, continuing the heat for 15 minutes after thorough fusion has occurred, stirring frequently, and filtering by hot filtration. The sodium sul-

phate removes moisture and assists in separating the membrane. Suet is used in pharmacy in the preparation of ointments, cerates, cosmetic creams, etc.

Aromatic Pastilles.

(M. U.) Aromatic pastilles are prepared in various ways. They invariably contain aromatic powders, resins or balsams, charcoal, saltpetre, etc. the whole molded into the desired form by the use of midclage of tragacanth, or some other suitable excipient. The following, from the Era Formulary, are the most used formulas:

- | | |
|--------------------------|----------|
| (1) Benzoin | 1 ounce |
| Cascarilla bark | 1 ounce |
| Myrrh | 2½ drams |
| Oil nutmegs | 1 dram |
| Oil cloves | 1 dram |
| Oil cinnamon | 1 dram |
| Saltpetre | 4 drams |
| Charcoal, powdered | 8 ounces |

Mucilage, q. s.
Make into small cones.

- | | |
|-----------------------|------------|
| (2) Benzoin | 125 parts |
| Cascarilla bark | 125 parts |
| Myrrh | 41.5 parts |
| Wood charcoal | 650 parts |
| Oil of nutmeg | 25 parts |
| Oil of cloves | 25 parts |
| Saltpetre | 66.5 parts |

And the necessary quantity of solution of gum tragacanth.

- | | |
|-----------------------------------|-----------|
| (3) Wood charcoal, powdered | 500 parts |
| Benzoin | 375 |
| Tolu balsam | 125 parts |
| Vanilla beans | 125 parts |
| Cloves | 125 parts |
| Oil of sandalwood | 3 parts |
| Oil of neroli | 3 parts |
| Saltpetre | 50 parts |

Gum tragacanth enough.
Make into small cones.

Typewriter Ink.

(F. D. L.) The Scientific American some years ago published the following: Take petrolatum of high boiling point, melt it on a water bath or slow fire, and incorporate by constant stirring as much lampblack or powdered drabblack as it will take up without becoming granular. If the fat remains in excess the print is liable to have a greasy outline; if the color is in excess the print will not be clear. Remove the mixture from the fire and while it is cooling mix equal parts of petroleum benzine and rectified oil of turpentine, in which dissolve the fatty ink, introduced in small portions by constant agitation. The volatile solvents should be in such quantity that the fluid ink is of the consistency of fresh oil paint. Apply the ink, after agitation, by means of a soft brush and rub it well into the interstices of the ribbon with a toothbrush. Hardly any ink should remain visible on the surface. For colored ink use Prussian blue, red lead, etc., and especially the aniline colors. For black, try the following:

- | | |
|---------------------|---------------|
| Aniline black | ½ ounce |
| Alcohol | 15 fl. ounces |
| Glycerin | 15 fl. ounces |

Dissolve the aniline black in the alcohol and the glycerin. Ink as before.

Typewriter Copying Ink.

- | | |
|------------------------|---------------|
| Transparent soap | 1 ounce |
| Glycerine | 4 fl. ounces |
| Water | 12 fl. ounces |
| Alcohol | 24 fl. ounces |
| Aniline dye | Sufficient |

Dissolve the soap in the water and glycerin, with the aid of heat; dissolve the aniline in the alcohol, and mix the two solutions. If the ink is too soft add more soap.

Chartreuse.

(A. D. N.) Regarding the preparation of this proprietary liqueur MacEwan, in "Pharmaceutical Formulas," says that the Chemist & Druggist received in September, 1895, "an official intimation that the process of manufacture of the liqueur de La Grande Chartreuse has never been divulged and that the expression 'Chartreuse' applies only to the products made by the Rev. Gabriel Alfred Grezier at La Grande Chartreuse, who is the procurator of the monastery of that name. Further, proceedings will be taken against any person who at-

tempts to use the name 'Chartreuse' in respect of liqueur not manufactured at La Grande Chartreuse." MacEwan also states that: "The secret of the manufacture of this famous liqueur has been exceedingly well guarded by the monks who had their home at Grenoble, whence they removed to Romont, Switzerland, in 1880, owing to the action of the French Government. The peculiar flavor of the liqueur was wont to be attributed to the rare herbs which grew around the monastery, and a few years since a Duren professor of botany thought he had discovered the herb whose flavor has eluded the nose and palate of every imitator, but the professor did not say what it was. The fact remains that those who have visited the monastery, and have been shown the distillery, have come away as wise as when they entered. One man who went there tells us that in the distillery 'great copper alembics were at work distilling the infusion of plants. On a shelf high above was a great basin full of syrup, which is a secret as much as the infusion itself. When ready, the syrup and the infusion flow into the great casks that line the cellars. There are sixty of these casks, and each one holds about £3,000 worth.'" Here are some of the attempts which have been made to hit the composition of the liqueur, which, by the way, is made green, white and yellow. There is also a medicinal elixir which differs in composition from the after-dinner liqueurs:

Green.

- | | |
|-----------------------------|-----------|
| Alpen artemisia | 5 ounces |
| Angelica-seeds | 2½ ounces |
| Angelica-root | 10 drams |
| Arnica-flowers | 2½ drams |
| Poplar-buds | 5 ounces |
| Chinese cassia | 2½ drams |
| Hyssop | 6 ounces |
| Nutmeg | 2½ drams |
| Lemon-scented melissa | 10 ounces |
| Peppermint | 5 ounces |
| Thyme | 5 drams |
| Rectified spirit | 10 pints |
| Water | 5 pints |

White.

- | | |
|-----------------------------|-----------|
| Alpen artemisia | 2½ ounces |
| Angelica-seeds | 2½ ounces |
| Angelica-root | 5 drams |
| Calamus | 5 drams |
| Cardamoms | 5 drams |
| Chinese cassia | 2 ounces |
| Hyssop | 2½ ounces |
| Nutmeg | 2½ drams |
| Lemon-scented melissa | 5 ounces |
| Cloves | 5 drams |
| Tonka bean | 1½ drams |
| Rectified spirit | 10 pints |
| Water | 5 pints |

Yellow.

- | | |
|-----------------------------|-----------|
| Alpen artemisia | 2½ ounces |
| Angelica-seeds | 2½ ounces |
| Angelica-root | 2½ ounces |
| Arnica | 2½ drams |
| Poplar-buds | 5 drams |
| Chinese cassia | 2½ drams |
| Hyssop | 3 ounces |
| Nutmeg | 1½ drams |
| Lemon-scented melissa | 5 ounces |
| Peppermint | 2½ drams |
| Coriander | 30 ounces |
| Rectified spirit | 10 pints |
| Water | 5 pints |
| Aloes | ½ ounce |

In each case macerate for fourteen days, then press and filter or distill. The essence is sufficient for making 125 pints of liqueur with equal parts of syrup (1 in 2) and rectified spirit

Tripoli.

(F. L. H.) We know of no practical process for extracting the red color from tripoli powder, though it is possible that treatment with dilute hydrochloric acid, as employed in the preparation of purified tæcum, may remove most of it. This treatment may also remove some of the other constituents, the reaction, of course, depending upon the chemical composition of the particular sample under investigation. As tripoli of the lighter shades can be so easily and cheaply obtained, it would hardly seem worth while to attempt to "bleach" the sample you have. It should be remembered, however, that tripoli is of variable composition, and the name has been applied to earthy substances of various kinds. The substance to

which this name was originally applied was procured from Tripoli, in Africa. It consists almost entirely of silica, and when examined by the microscope is found to be composed of the skeletons of infusoria, etc. In trade, the name tripoli has also been applied to rotten stone, a decomposed siliceous limestone, the lime of which has been washed away, leaving the silica in condition to be used as an abrading agent. Rotten stone is not produced in the United States, the supplies being brought mainly from Great Britain. According to the report of the U. S. Geological Survey (Mineral Resources of the U. S., 1893) the term "tripoli" has been applied to a siliceous earth found in Newton Co., Mo. This substance is a distinct mineral, being a siliceous limestone, from which the carbonate of lime is said to have been leached out, leaving the silica in a very porous state. The product is used for water filters, in the form of disks, cylinders, tubes, ink blotters, etc. It is very porous and absorbs fluids readily. When the surface becomes clogged by drying, it is easily cleaned by rubbing gently over it a piece of ordinary sand paper. This material is also ground into a fine powder for polishing metal surfaces and for manufacturing various cleaning preparations. According to the last report of the U. S. Geological Survey, Virginia produced 1,000 short tons of tripoli in 1896, and Georgia had a small output of 15 tons.

PHARMACY.

GLACIALIN is a meat preservative consisting of borax 1 part and boric acid 3 parts.

NAPHTHASALICYN is recommended as a disinfecting solution for clothing, etc., and consists of a solution of salicylic acid, naphthol and borax. Ammonia water may be substituted for borax. (Ph. Post.)

TO DESTROY CATERPILLARS the following methods are recommended: Spraying with a decoction of tobacco, or with 2 per cent. carbolic acid water; or with 0.5 per cent. solution of copperas; cautious dusting with burnt lime. (Drog. Ztg.)

QUINOLINE-BISMUTH SULPHOCYANIDE has been used to advantage as an antiseptic in form of dusting powder. It is a reddish-yellow, granular powder having a sharp odor, insoluble in water, alcohol and ether. It melts at 76° C. (Ap. Ztg.)

PRESERVALIN, a preparation recommended for preserving meat and other foods, consists, according to an analysis by Biginetti, of sodium chloride 9.08, potassium nitrate 24.6, borax 34.6, and boric acid 32.2 per cent. (Ph. Post.)

LANCASTER WHOOPING COUGH MIXTURE has been found to consist of tincture of belladonna 5 p., phenacetine 2.5 p., extract of castanea vesca 30 p. and alcohol 12.5 parts. It is given to children of one year in 10 drop doses every two to six hours, to children of ten years or over in teaspoonful doses. (Ph. Post.)

MOTH POWDER WITH AGREEABLE ODOR may be prepared as follows: Clove, 50 p., black pepper 100 p., quassia 100 p., reduce to powder, mix, and add oil of cassia 1 p., oil of bergamot 1 p., camphor 5 p., (reduced to powder with aid of 20 p. ether), effloresced ammonium carbonate 20 p. and orris root 20 parts. (Drog. Ztg.)

EUCALIN B. IN DENTISTRY.—Légrand (Rev. de Ther.) makes use of a 2 per cent. solution, which is entirely free from danger and permits the operation to be performed immediately, while the employment of a 1 per cent. solution would necessitate a wait of five minutes. The patient may be allowed to go immediately after the operation, which is not possible when cocaine is used. An injection of 1 Cc. of a 2 per cent. solution of eucaine B. suffices in most cases for the extraction of a large molar without pain.

GLUTOL AS ANTISEPTIC.—Doyen (Bull. de Ph. Comm.) reports upon the treatment of open septic wounds with glutol and states it to be superior to all other antiseptic powders. Glutol is a grayish powder, inodorous and insoluble, prepared by the action of formaldehyde on gelatine.

CONSUMPTION OF AIR.—"It is computed that when at rest we consume 500 cubic inches of air a minute," says The Medical Record. "If we walk at the rate of one mile an hour we use 800; two miles, 1,000; three miles, 1,600; four miles, 2,300. If we start out and run six miles an hour we consume 3,000 cubic inches of air during every minute of the time."

AROMATIN is a specialty prepared by E. Dolle. It consists of two parts, a liquid and a powder. The liquid has a milky appearance and an agreeable taste. Its principal ingredient is pyrophosphate of iron, suspended in a finely divided form. The powder is effervescent sodium pyrophosphate. The dose for adults is a tablespoonful of the liquid two or three times daily, followed by a powder, dissolved in half a wineglassful of water. (Ph. Post.)

SALUBROL is an odorless and tasteless powder, and is a more energetic antiseptic than iodoform, without any of its inconveniences. It has no injurious action on the tissues or organs. It is also a good hæmostatic and does not attack the mucous membranes. Berger recommends it strongly for treating affections of the buccal cavity and for the extraction of teeth. (Bull. de Ph. Comm.)

DISGUISSING THE TASTE OF COD-LIVER OIL.—The following has been recommended as an easy way to take cod-liver oil.—(Ch. & Dr.)

Cod-liver oil	400 grammes
Syrup of tolu	200 grammes
Tincture of tolu	12 drops
Essence of cloves	2 drops

Do not emulsify. Shake well before using. Dose, a tablespoonful two or three times a day.

LIQUOR HÆMALBUMINI.—Hæmalbumin 30 p., distilled water 652 p. To the solution, prepared with a gentle heat, add the following: Simple syrup 200 p., diluted alcohol 100 p., aromatic solution of saccharin 8 p., arrak 7 p., spirit of nitrous ether 2 p., saccharole of bitter almond and rose, of each 0.4 p., saccharole of cumarin 0.2 p. (Aromatic solution of saccharin consists of saccharin 2.5 p., vanillin 0.5 p., oil of cinnamon 2 p. and absolute alcohol 95 p.) (Ph. Centr.)

PROTALBIN-SILVER, a silver-albumin preparation is well suited to the treatment of gonorrhea, because of its feeble irritant action on the mucous membranes. It is used in solutions containing 0.25 to 1.5 per cent. Protalbin-silver is a grayish-white powder, which dissolves in water to the extent of 10.5 per cent. at 18° C. It is not precipitated from its solution by chlorides or albumins. Glycerin, blood-serum, alkali and acid albumins, and peptone solutions are also solvents. (Ph. Post.)

SACCHARIN-SODIUM has been found to be an excellent intestinal antiseptic. It is a soluble powder containing 30 per cent. of pure saccharin. In doses of 1 Gm. (15 grains), given once or twice daily, it diminishes considerably the number of germs usually found in the intestines, particularly those of the coli bacillus. The remedy has no injurious influence on the kidneys. Because of its intensely sweet taste it must be given in capsules. (Ztsch. f. Ph.)

RHUS AROMATICA FOR INCONTINENCE OF URINE.—The fluid extract of Rhus aromatica is recommended by Froyberger for the treatment of incontinence of urine in children, in the following form: Fluid extract of Rhus aromatica 10 drops, aromatic syrup 20 drops, water 1 fl. drachm. Three such doses are to be taken daily. Improvement was usually noticeable after the seventh day; of 20 cases most were cured entirely, while the remainder, except 2, showed a decided improvement. (Ap. Ztg.)

DIDYMIUM CHLORIDE is obtained as a by-product in the preparation of the rare earths for Welsbach lights. It is recommended by Drossmann as an energetic disinfectant and preservative, as it prevents every decomposition-process in solutions of 1 in 500 to 1 in 1000, thus showing its superiority over all known antiseptics. The salt comes into the market in form of an odorless solution containing 25 to 30 per cent. It is free from caustic action. The sulphate is also recommended as a disinfectant, to be used in form of dusting powder. (Ph. Post.)

THE ACTIVITY OF BROMOFORM WATER is, according to Mathieu, and Richaud, greater than is usually supposed, provided the bromoform is left in contact with the water for some considerable time and the mixture shaken frequently. In this way 0.3 to 0.35 per cent. of bromoform was dissolved, which is equivalent to about 0.06 Gm. (1 grain) in a tablespoonful of water. So prepared, bromoform water has been used with success for stomachache, nausea, cough, etc. (Bull. de Ther.)

TESTS FOR BROMIDES IN URINE.—A simple and very sensitive test is given by Jolles: 10 Cc. of urine are placed in a small flask having a narrow-neck, acidulated with sulphuric acid and an excess of potassium permanganate added. A strip of filter paper saturated with a solution of para-dimethyl-phenylene-diamine is then inserted into the neck, and the liquid warmed. In presence of bromine a colored ring is formed on the paper, violet inside and blue to green and brown toward the edges. The reaction shows 0.001 per cent. of sodium bromide. (Südd. Ap. Ztg.)

FERRATED WINE OF CINCHONA.—The following formula is proposed by Masius: Cinchona bark 9 p., gentian, 6 p., citrate of iron 5 p., wine 350 p., tincture of orange peel 27 p., solution of ferrous sulphate (10 p. c.) 54 p., sugar 50 p., ammonia water, q. s.—The cinchona and gentian are macerated for 6 days with the wine. The ferrous sulphate solution is precipitated with ammonia, the precipitate washed and the tincture added. The mixture is allowed to stand until a filtered sample is no longer precipitated by ferric chloride, and finally the citrate and sugar dissolved in it without heat. (Bull. scient.)

TOXIC PTOMAINES OF PRESERVED MEAT.—Van Ermengin states that the toxic ptomaines sometimes found in preserved meats, hams, game pies, etc., are due to the presence of a specific organism *Bacillus botulinus*. The soluble toxine it secretes, called botuline by the author, is stated to be so intensely toxic that one thousandth part of a milligramme killed a rabbit in twenty-four hours. Fortunately this ptomaine is destroyed at a temperature of 60° to 70° C., and the bacillus which produces it at 55° C., so that thorough cooking will remove all dangers in the case of salted or smoked meats. (Jour. de Pharm.)

PHOSOTE AND TAPHOSOTE are combinations of creosote and phosphoric acid. Phosote is claimed to be the best form of administering creosote, being completely absorbed by the intestines. It is a syrupy, colorless liquid, almost entirely free from the odor and taste of creosote, of the sp. gravity 1.20 to 1.25, and containing about 80 per cent. of creosote and 20 per cent. of phosphoric anhydride. Its dose is a dessertspoonful daily. Taphosote is a similar liquid, of grayish color, being a compound of tannin, creosote and phosphoric acid. It has been found very useful in treating diarrhoea of tuberculosis. (Ph. Post.)

DISTRIBUTION OF MANGANESE.—P. Richard finds that the presence of manganese is almost universal in the ash of organized matter, whether of animal or vegetable origin. The seeds of phanerogams and the tissues of rapidly growing cryptogams are especially rich in this metal. It is also found in various marine animals, such as molluscs and crustacea, in the bones, eggs, flesh, and hair of vertebrates, also in cow and horse dung. The accumulation of the metal in the seeds and actively vital parts of plants, as well as its occurrence in the two last-named manures, is confirmatory of the theory lately ad-

vanced as to its vital importance in the vegetable and animal economy. (Comptes rendus, Pharm. Jour.)

BISMUTH TRI-IODIDE.—The following is a recently patented process for preparation of this compound: Basic bismuth salts are made to react with hydriodic acid, or bismuth oxy-iodide is brought in contact with any convenient acid, whereby finely divided bismuth tri-iodide is formed, mixed with the secondary products formed in the reaction. When 45 parts of gallic acid are gradually added to 50 parts of bismuth oxy-iodide, in presence of water, and the mixture cautiously warmed under constant stirring, until it has assumed a light grayish-green color, the result will be a mixture of bismuth tri-iodide and bismuth subgallate. When sulphuric acid is used in place of gallic, bismuth sulphate is formed. (Ph. Post.)

MELALEUCA VIRIDIFLORA.—The oil of this plant, called also "Gemenol" and "Niaouli-oil," must be employed in an absolutely pure form, according to Dubouquet. Impure oils have dangerous secondary effects, while the pure oil is neither toxic nor caustic and may be used in large doses, even subcutaneously. It may be used to advantage for various purposes. When pure, the oil has remarkable antispasmodic, analgesic, anticephalalgic and antiseptic virtues. The author has used it for affections of the respiratory organs (particularly tuberculosis) for the kidneys and for surgical purposes, and has found that it exerts a specific remedial action on the mucous membranes, without irritating. (Ap. Ztg.)

THE DEADLY ICE-CREAM.—Several inquests have lately been held in the East End (London, Eng.) on the victims of the succulent ice-cream, and the hokey-pokey vender knows that his wares must be above suspicion, or his takings will be infinitesimal. (Br. and Co. Dr.) Within a short distance of Shoreditch Church are to be seen rival traders in the aforementioned dainty, one of whom has recently embellished his stall with the following notice:

We Defi Inspection.
Analysis.

Milk	60	per cent.
Sugar	20	do.
Miscellaneous	16	do.
Vanilla	4	do.

PREPARATION OF BOUGIES.—As a base for bougies meeting every requirement Souard (Rep. de Ph.) proposes the following mixture: Cacao butter 2 p., lanolin 1 p., white wax 1 p., which is kept in stock. The pencils are prepared by mixing the medicinal substance with the base, previously warmed to a semi-fluid consistence, introducing the mixture by suction into glass tubes of 20 cm. length and 3 mm. diameter, closing with rubber stoppers and cooling them in an upright position. When solidified, the bougies may be pushed out with a wire or rod of the same diameter. They may be dispensed at once, but do not attain the proper consistence until the following day.

IRON-ALBUMIN PREPARATIONS.—A method of preparation patented by Wuefling is as follows: A solution of egg-albumen is mixed with a solution of an iron compound of nitroso-naphthol-sulphonic acid and the albumin coagulated by addition of acetic acid and warming, whereby also a certain quantity of the iron-nitroso compound is precipitated, in chemical combination with the albumin. The products so obtained are free from odor and taste, are very sparingly soluble in water and diluted acids, but easily soluble in alkalis. They are not acted upon by the fluids of the stomach and cause no irritation of the mucous membranes, but are dissolved by the alkaline fluids of the intestines and are there absorbed. (Ph. Post.)

EXAMINATION OF INSECT POWDER. Durrant (Ph. Ztg.) proposes the following method: About 6 Gm. of the powder are placed in a glass cylinder, and macerated for 30 minutes with ether of sp. gr. 0.735. The ether is then poured off and the procedure repeated 4 times, when the combined ethereal solutions should measure about 30 Cc. If the powder is pure, the solution will have a bright yellow color. If it is distinctly green, an adulteration may be assumed. In absence of much green

coloring matter, the ether is evaporated at a low temperature and the residue weighed. It should not weigh less than 0.243 Gm. from 6 Gm. of powder. The best qualities give up to 0.356 Gm. of ether extract, which has the characteristic odor of the flowers. As adulterations the author mentions particularly the entire, powdered chrysanthemum plant, also quassia, leaves of aloes, senna, etc., saffron, and chrome-yellow.

PYROSAL AND PHENOSAL are new antipyretic compounds prepared by J. D. Riedel in Berlin. The first is a salicyl-acetate of antipyrin, the second the corresponding salt of phenetidin. They are in colorless leaflets or needles, which are sparingly soluble in water and have a sour but not bitter taste. Pyrosal contains 50 per cent. of antipyrin and 37 per cent. of salicylic acid, phenosal 57 per cent. of phenetidin and 34 per cent. of salicylic acid. Both remedies are given in doses of 0.5 Gm. (7 to 8 grains), repeated 2 to 6 times daily. Pyrosal has been found valuable in polyarthritides, pleuritis, influenza and migraine, while phenosal has been used successfully for acute articular rheumatism and ischias. No secondary effects have been noticed with either preparation. (Ph. Post.)

NEW METHOD OF OBTAINING HIGH TEMPERATURES.—M. Goldschmidt, says the *Revue Scientifique* (Trans. in Lit. Digest), has described to the congress of German Electro-Chemical Societies a new method for obtaining the high temperatures necessitated by the reduction of some of the more refractory metals. This method consists in utilizing the heat furnished by the combustion of aluminum. The mass to be heated is surrounded with an envelope formed of a mixture of powdered aluminum and metallic oxides. By directing a blow-pipe flame on this envelope the local decomposition of the oxides is brought about, and the freed oxygen feeds the combustion of the aluminum. Thus temperatures approaching those of the electric furnace are obtained quite rapidly in the interior of the envelope. The method may be modified by substituting magnesium or the carbide of calcium for the aluminum, and in certain cases the oxides may even be replaced by sulfides.

TINCTURE OF GUAIAK AS REAGENT.—Experiments made by Breteau (Jour. Ph. et Ch.) indicate that the color reactions of guaiac, which are frequently used for the detection of blood, hydrocyanic acid, phosphorus, etc., cannot always be depended upon, since the reactions may take place, or fail to take place, under conditions not well understood. Thus, a blue coloration is obtained when equal volumes of tincture of guaiac and oxygenated oil of turpentine are mixed and then shaken with water, but is never obtained when the oil of turpentine is added to a mixture of water and the tincture. The reaction that is given by blood and the tincture, in presence of oil of turpentine, is also given by milk. Ether, alcohol and benzoin sometimes color tincture of guaiac blue in presence of turpentine, at other times not. When a piece of paper moistened with the tincture is placed in a glass vessel, on the bottom of which is a little phosphorus in water, the paper becomes blue, but when the paper is replaced by a piece of porcelain moistened with water and tincture of guaiac, there will be no reaction, showing that the paper plays an essential part in this reaction. (Sudd. Ap. Ztg.)

A SANITARY BARBER SHOP.—The conditions existing in barber shops, according to Herr Berger, whose ideas are abstracted from a German journal in *The Scientific American Supplement*, "are responsible for the spread of many diseases, not merely of the skin, hair, and beard, but infectious maladies as well. He suggests the following rules for practical guidance of barbers and legislators, since he considers that a barber shop is properly subject to public control: The barber himself should be free from epilepsy, spasms of any kind, drunkenness, and infectious diseases. Persons afflicted with contagious diseases of the skin, hair, beard or genitals should not be allowed in a public shop, but should be attended to at their homes, where they should have all their own instruments. In the shop all brushes and combs should be made of good material so that they may withstand frequent disinfection. Putt-balls should be replaced by balls

of absorbent cotton which should be thrown away after they have been once used. Towels, etc., should be freshly laundered for each person unless paper napkins are employed and used only once. Combs should be cleaned and disinfected with corrosive-sublimated solution after each use. Shears, razors, and clippers should be boiled or wiped thoroughly with alcohol after each use. A barber should never wipe the razor upon his hand. Brushes to dust away the cut hair from the neck should be forbidden. A barber should pay special attention to the cleanliness of his own hands and person, and should be instructed in the appearances of diseases of the skin, scalp and beard."

ABSTRACTION OF WATER FROM ALCOHOL WITH CALCIUM CARBIDE.—Yvon sometime ago recommended calcium carbide as a dehydrating agent for the preparation of absolute alcohol. The water reacts with this compound with the formation of acetylene and calcium hydrate. The alcohol thus treated, however, acquires a disagreeable odor, which Yvon has sought to remove by shaking with anhydrous copper sulphate. According to Vitali, this treatment does not effectually remove the odorous substances, consisting of sulphur compounds of phosphorus and nitrogen, which in presence of water evolve ammonia, phosphamin and hydrogen sulphide. Alcohol is, according to Vitali, also capable of dissolving six times its volume of acetylene gas. Vitali has succeeded in rendering the alcohol inodorous by the addition of mercurous nitrate, which forms a white insoluble compound with acetylene. His procedure consists in adding finely pulverized calcium carbide to the alcohol to be dehydrated, in sufficient quantity that no more gas is evolved, the gas giving a white precipitate with neutral silver nitrate or with ammoniacal silver nitrate a yellowish, later brown, precipitate. The alcohol is then filtered, or drawn off clear after settling, and finely powdered mercurous nitrate added with constant stirring, until a filtered sample no longer gives a reaction with silver nitrate. When this point is reached the foreign odor will have been removed. After filtering again, the liberated nitric acid is neutralized with potassium carbonate and the alcohol distilled. The reaction of calcium carbide may also be utilized for the detection of water in many liquids. Bubbles of acetylene gas are liberated and may be recognized by the reaction with silver nitrate. Vitali in this way detected water in commercial absolute alcohol, ether, chloroform, etc., but not in carbon disulphide, although this had been kept under water, a proof of the absolute insolubility of water in this liquid. (Sudd. Ap. Ztg.)

DETECTION OF PARAFFIN AND STEARIN IN WAX.—Adulterations with paraffin may be detected as follows: The wax, in form of shavings, is macerated half a day with twenty times its weight of ether, in a tightly corked bottle. Since ether dissolves only about 50 per cent. of wax, a solution of considerably more than half by the ether may be considered as an indication of adulteration. It must be taken in consideration that it is not likely any one would take the trouble to melt a quantity of wax to add less than 30 to 50 per cent. of an adulterant, as it would not pay for the labor. Adulterations with only a few per cent. of paraffin, therefore, need hardly be expected, and solubility in ether may be looked upon as a fairly reliable means of detection, notwithstanding the fact that different samples of pure wax vary in ether-solubility within narrow limits.—The presence of paraffin in wax may also be indicated by the melting point, which in pure beeswax is 61° to 62° C. Paraffin melts at temperatures ranging between 45° and 55° C.—Stearin is detected as follows: The wax is boiled during five minutes with twenty times its weight of alcohol, the mixture then cooled and allowed to stand several hours until the wax is completely solidified. The alcohol is then filtered and water added to the clear filtrate. In presence of stearin the addition of water causes a milky turbidity.—Another method of testing for stearin consists in boiling the wax for two minutes with a solution of 1 part of sodium carbonate in 50 parts of water. The solution does not affect pure wax, but in presence of stearin effervescence takes place and the mixture becomes slimy. It is stated that 2 per cent of stearic acid may be detected by this means. (Drug. Ztg.)

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

ANOTHER PRIZE WINNER.

Ashland, Oregon, Sept. 9, 1898.

To the Pharmaceutical Era:

I beg leave to acknowledge the receipt of your letter informing me that I have won the thirteenth prize and to sincerely thank you for the congratulations I hope I deserve. I have just returned from my vacation and am agreeably surprised to find the prize awaiting me, and I assure you it is highly appreciated, not only for its true worth, but its possession also marks my satisfactory completion of the Era Junior Course, and I feel that I have greatly profited by its valuable instruction. Through it I have successfully passed the examination for Assistant Pharmacist before the Board of this (Oregon) State. It is with pleasure that I look forward to the senior course, for I am sure that it will prove as valuable to the earnest student as the junior course already has. Yours truly,

WILMER M. POLEY.

FOR A BUSINESS ORGANIZATION.

Chicago, Ill., Sept. 12, 1898.

To the Editor:

Permit me to add my approval to your article called out by Mr. Mann's plan. The writer has attended several Illinois State Pharmaceutical Association meetings, but none in the last five years, owing to the free liberation of the superfluous gas, which always escapes from the ever attending professors, who do nothing else but occupy the time of the meetings in opposing any and every question that may come up. It is a most nerve trying ordeal to sit and listen to these chronic front row State Association Meeting haunTERS, who never rolled a pill and know absolutely nothing about the wants of the pharmacist and the condition of his business, who attend the meetings for no other purpose than to blow their penny trumpets to their great and only satisfaction. We want to hear from the real pharmacists!

Well can we echo the motto: None but registered pharmacists need apply.

An R. P. who has been there.

A PROTEST FROM TEXAS.

Marble, Falls, Texas, September 16, 1898.

R. V. Pierce,

Buffalo, N. Y.

Dear Sir:

Your "reply" received. Whatever your views are, they will not stop our fight against over \$8.00 preparations. It is unreasonable; you advertise 6 for \$1.00; \$1.50 a dozen is not "just."

We have reduced our sales of your Discovery and Prescription one-half, and assure you that we have not "substituted," nor said anything about your preparations which was not true. We can also assure you that more than half of our patrons ask our advice when buying "patents." We pity the druggist in whom the people have less confidence than an advertised secret preparation. This confidence you have been deftly trying to destroy with your cry of "substitution." If druggists resent not when their bread is taken, what will they not be guilty of next?

We have not over \$15.00 worth of non-secrets on hand, nor have we ever had much more. If, however, "advanced" manufacturers continue to spend money on harrassing circulars we shall spend money on preparations of our own. We regret that you should rather have 25 cents than our \$4.00. Respectfully,

E. G. MICHEL.

PHOSPHATED WINE OF CINCHONA is prepared by Robin (Bull. de Ther.) according to the following formula: Potassium phosphate 15 Gm., distilled water 20 Gm., wine of cinchona 450 Gm., syrup of cinchona 50 Gm., phosphoric acid, 1 drop. (Ap. Ztg.)

(Special to the Era.)

THE VIENNA CHEMISTRY CONGRESS.

The third International Chemical Congress, recently held at Vienna, although less numerously attended than the Paris Congress of 1896, was a large and interesting gathering of savants.

Prof. Dr. H. v. Perger presided, the general secretary being M. Strohmer, and the meetings took place at the University (the handsome building on the Ringstrasse of which we give an illustration), from July 23 to August 2 last.

The twelve sections were as follows:

- | | |
|---|------------|
| I. Analytical, | Chemistry. |
| II. Food, Medicinal and Pharmaceutical, | |
| III. Agricultural, | |
| IV. Sugar Industry, | |
| V. The Chemistry of Brewing, | Chemistry. |
| VI. The Chemistry of Winemaking, | |
| VII. Inorganic Industrial, | |
| VIII. Metallurgical and Explosive, | |
| IX. Organic Industrial, | Chemistry. |
| X. Graphic Industrial, | |
| XI. Education and Professional Interests, | |
| XII. Electro-Chemistry, | |

The proceedings were mostly conducted in German, though French was occasionally used. The French delegates were about 50 in number and included many well-known savants. The Hungarian and Czech element was



VIENNA UNIVERSITY.

very conspicuous: the Russians were in strong force, international scientific meetings within easy reach of the Czar's dominions being few and far between. The German Empire, on the contrary, was but sparsely represented; England was conspicuous by her absence. The American delegates were five in number—Dr. W. B. Rising, of California University; Dr. Flint (officially representing the Navy Dept.); Dr. Francis Wyatt, of New York; Dr. Whiteman, chief chemist of the Sugar Trust, and, last not not least, Dr. H. W. Wiley, chemist in chief of the Agricultural Dept. of Washington, to whom we are indebted for the greater part of these notes. Japan, by the way, was officially represented, not by a native, but by a Chicagoan.

Artificial Albumen.

The sensation of the Congress was Dr. Lillienfeld's announcement of his production of synthetic albumen, already noticed in the Era. By means of the condensation of phenol and amido-acetic acid with phosphoric chloric oxide the lecturer produced the substance in the presence of the assembled chemists, subsequently demonstrating the identity of the synthetic and the natural substance by means of reactions. The discovery does not appear to have yet advanced beyond the laboratory stage, and experiments have yet to be made in its manufacture in large quantities, and its possibilities of supporting human life for a lengthened period. Should such tests turn out satisfactory, the question of commissariat in modern

European armies, provisions for explorers, etc., would be entirely revolutionized.

Fermentation without Living Cells.

which was practically demonstrated by Herr Eduard Buchner and is alleged to give the same results as the old system, was the second great novelty of the Congress, and very interesting to brewers and others.

International Uniformity of Analysis

of sugar substances was one of the points which these Congresses endeavor to realize. Enormous quantities of potash salts are annually exported from Germany to the United States; but the difference between the Teutonic and the American systems of analysis gives rise to continual Custom House disputes.

The same is true of beet sugar, of which the States annually import something like a million tons. Here the duty is estimated by polarisation of samples, but the Germans and Americans use a different process, and arrive at different results; lawsuits, etc., are the result. All this needless dispute and ill-feeling could be avoided by the adoption of an international system of sugar analysis, as already recommended by a recent German Congress.

Medicinal, Pharmaceutical, and Food Chemistry.

Section II, devoted to the above subjects, was presided over by Prof. Dr. Ernst Ludwig, "Hofrath" of the Vienna University, the vice-presidents being Herr Alois Kremel, a Viennese apotheker; Dr. J. Montherm, and Dr. G. Schaeferl. Several distinguished foreign visitors were elected honorary vice-presidents—Dr. W. B. Rising, of California; Monsieur Riche, professor at the Paris School of Pharmacy; Signor Piutti, professor of Pharmaceutical Chemistry at the Naples University; Prof. Ranwez, who presided over the Brussels Pharmaceutical Congress, and Messrs. Lecco Chicote, Cocone, Jonke, Jolin, Konya, Raumer, Vedrodi, Wouters and Zenoni.

The Papers.

Dr. Wroblewski's remarks on the "Nomenclature of albuloses and peptones" gave rise to a lively discussion. Another question studied was "In how far is it desirable to apply in pharmacy the latest methods of dosage for fats, waxes, balsams, etc.?" A committee consisting of Prof. Dieterich, Ranwez, Jonke and Wroblewski, was appointed to consider the matter, and draw up a report early enough to ensure its insertion on the printed proceedings of the Congress.

Monsieur F. Dupont (secretary of the Paris Sugar & Distillery Chemists' Association) contributed a paper on "The Milk Supply of Large Towns."

Dr. Freund, of Buda-Pesth, treated of "Methods of Examination of Toxine," Dr. H. Malfatte, of Innsbruck (Tyrol), of "Estimation of the Alloxur bodies in Urine," and Dr. Pross, of "Changes of Choline-containing bodies in the organs." The most interesting matter, however, was Hofrath Dieterich's proposition for

International Uniform Strength of Galenicals.

The idea is not new. M. Duyk, who brought it forward at the Brussels International Congress, was unfortunately prevented from being present at Vienna. After some discussion, the following resolution was voted:

"Subsection A of Section II of the IIId International Congress of Applied Chemistry considers it highly important and of pressing necessity that the strong galenical preparations of all manufacturers should contain the same quantity of the active ingredient. The chemical methods of determining the strength of these preparations should be the same in all countries. For extracts, tinctures and drugs it is recommended that the active principle be secured by shaking with the proper solvents; and in the case of alkaline bodies, that they be determined by titration with one hundredth normal acids, according to the methods recommended by Schelsinger, Sarkow, Beckurts, or Keller. For the determination of morphine, the Helfenberger method in its latest improved form is recommended."

This resolution is interesting as indicating the first steps towards the unification of Pharmacopoeias. It is to be hoped that the question will be thoroughly threshed out in 1900.

The Petes and Outings.

need not be detailed here, suffice it to say that Viennese

hospitality was not found wanting, and that the Oesterreichische Pharmaceutische Gesellschaft, celebrated the twenty-fifth anniversary of the foundation of their society on July 25th and 31st in a cordial and fitting manner.

The Next Congress.

is to be held at Paris in 1900. A rumor ran round the Congress that the Germans would propose to hold it at Berlin. The state of feeling of the numerous French delegates, who had fully determined that Paris shall be the "Hub of the Universe" (scientifically and otherwise) in 1900, may be imagined. Each delegate turned himself into an amateur electioneering agent with hearty goodwill, and Paris carried the day. Prof. Moissan, of the Paris School of Pharmacy, is chairman of the Organizing Committee and will probably preside over the Congress.

ETHERION.

As noted in this paper, Charles F. Brush, of Cleveland, O., at the recent meeting of the A. A. A. S. announced his discovery of a new constituent of the atmosphere. In abstracting his paper the Electrical Review says:—

"The gas is a constituent of the atmosphere, and is found absorbed in many substances. Its chief characteristic thus far experimentally determined is enormous heat conductivity at low pressure. Mr. Brush showed that its conductivity, even when mixed with a large excess of other gases, is something like a hundred times that of hydrogen, the best gaseous conductor heretofore known; and conjectures that the conductivity of the pure gas will be found a thousand or more times that of hydrogen."

"Mr. Brush referred to a prefatory paper on heat transmission by gases, read by him at last year's meeting of the association, and embodied some of its material in a curve chart showing the heat conductivity of several known gases at only a few millionths of atmospheric pressure, and also that of the new gas in several degrees of impurity. Mr. Brush discovered the new gas nearly a year and a half ago, while looking for occluded hydrogen in glass. He found not only hydrogen, but something of vastly greater importance."

"After many months of experiment he has recently effected partial separation of the new gas from the air by diffusion. In a first diffusion the heat conductivity of air was increased something like a hundredfold. Mr. Brush expects to obtain the gas in a state of approximate purity by successive diffusions of air."

"A table of figures was exhibited, showing the molecular weight, density, specific heat, relative mean molecular velocity, and heat conductivity of the gases whose heat-conducting curves appeared in the chart; and attention was directed to the evident close relationship between the heat conductivity and molecular velocity of the gases."

"From this relationship some other properties of the new gas were deduced. Taking the heat conductivity of the new gas at a hundred times that of hydrogen, a very conservative estimate, its mean molecular velocity at freezing temperature was calculated to be more than a hundred miles per second, and its density only a thousandth part that of hydrogen; while the specific heat was found to be six thousand times greater than that of hydrogen, the substance having the greatest specific heat heretofore known. These figures were adduced simply to show the order of magnitude that may be established by further investigation."

"It was shown that a gas having attributes anything like those cited could not possibly be confined to the earth's atmosphere, and hence the new gas, being found here, probably extends infinitely into space and constitutes an interstellar atmosphere. In recognition of this probability, Mr. Brush has named the new gas etherion, meaning 'high in the heavens.' Some evidence was cited tending to show that etherion is a mixture of at least two different gases, and Mr. Brush hazarded the conjecture that on further investigation three or more count for at least some of the phenomena heretofore gases will be found, forming one or more periodic groups of new elements all very much lighter than hydrogen. The possibility that etherion may be found to be identical with the so-called ether was touched upon, and Mr. Brush expressed the hope that it would be found to be attributed to the ether."

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Ph.D.
Virgil Coblenz, A.M., Ph.D.
Wilbur G. Compher, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heebner, Ph.M., Ph.G.
George B. Kaufman, B.Sc., Ph.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G., Ph.D.
Edward Kremers, Ph.D., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.
CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTOR :

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison.
Oscar Oldberg, Ph.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Reed, M.D., C.M.
Edsel L. Ruddick, Ph.M., M.D.
Henry H. Rusby, M.D.
Samuel P. Sadler, Ph.D.
L. E. Sayre, B.Sc., Ph.M.
Wilbur L. Scoville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wulling, Ph.G., Ph.M.D.

JUNIOR COURSE. LECTURE No. 3.

Inorganic Chemistry.

Classification of the Elements.
Notation and Nomenclature.

Metals and Non-Metals.—An old division of the elements was into two groups, known respectively as Metals and Non-Metals. To the former belonged such elements as gold, lead, iron and copper, and to the second, such as sulfur, nitrogen, oxygen, etc. Elements which had a peculiar luster, were good conductors of heat and electricity, and whose oxides and hydroxids combined with acids to form salts were called metals. Elements which did not possess those qualities, or possessed them in less degree, were classed with the non-metals. As the number of known elements became larger and the knowledge of chemistry increased, it was discovered that certain elements were capable of exhibiting the characters of both classes, according to circumstances. Consequently the old distinction has become of less value as a basis of classification, though still useful where exactness is not required. The metals are also known as the *base-forming* elements, and the non-metals as the *acid-forming* elements.

The "Natural Classification" of the elements, or the "Periodic System," as it is generally termed, is an attempt to arrange the elements in such an order as to exhibit all their relationships.

The classification given below is in the main that of the periodic system, and exhibits the order in which the elements will be considered in the subsequent lectures.

It is advisable that the student familiarize himself with the grouping of the elements, and with their symbols as an aid to his further studies.

As a matter of convenience each group is known by the name of its first member, though this is not always the most important.

Names and Groups.	Symbol.	Valence.	Atomic Weight.
Hydrogen.	H.	I.	1.
Halogen Group.			
Fluorine.	F.	I.	18.91
Chlorine.	Cl.	I, III, V.	35.18
Bromine.	Br.	I, III, V.	79.34
Iodine.	I.	I, III, V.	125.89
Manganese.	Mn.	II, III, IV, VII.	54.57
Oxygen Group.			
Oxygen.	O.	II.	15.88
Sulfur.	S.	II, IV, VI.	31.83
Selenium.	Se.	II, IV, VI.	78.42
Tellurium.	Te.	II, IV, VI.	126.52
Chromium Group.			
Chromium.	Cr.	II, VI.	51.74
Molybdenum.	Mo.	II, VI.	95.26
Tungsten.	W.	IV, VI.	183.43
Uranium.	U.	II, VI.	237.47
Nitrogen Group.			
Nitrogen.	N.	III, V.	13.83
Phosphorus.	P.	III, V.	30.79
Arsenic.	As.	III, V.	74.44

Antimony.	Sb.	III, V.	119.52
Bismuth.	Bi.	III, V.	208.54
Vanadium Group.			
Vanadium.	V.	V.	50.99
Columbium.	Cb.	V.	93.02
Tantalum.	Ta.	V.	181.45
Carbon Group.			
Carbon.	C.	II, IV.	11.91
Silicon.	Si.	IV.	28.13
Germanium.	Ge.	IV.	71.93
Tin.	Sn.	II, IV.	118.15
Lead.	Pb.	II, IV.	205.36
Titanium Group.			
Titanium.	Ti.	IV.	47.79
Zirconium.	Zr.	IV.	89.72
Cerium.	Ce.	III, IV.	135.30
Thorium.	Th.	IV.	230.87
Boron Group.			
Boron.	B.	III.	10.86
Aluminum.	Al.	III.	26.91
Gallium.	Ga.	III.	69.33
Indium.	In.	III.	112.99
Thallium.	Tl.	I, III.	202.61
Lithium Group.			
Lithium.	Li.	I.	6.97
Sodium.	Na.	I.	22.88
Potassium.	K.	I.	38.82
Rubidium.	Rb.	I.	84.78
Caesium.	Cs.	I.	131.89
Copper Group.			
Copper.	Cu.	I, II.	63.12
Silver.	Ag.	I.	107.11
Gold.	Au.	I, III.	195.74
Beryllium Group.			
Beryllium.	Be.	II.	9.01
Magnesium.	Mg.	II.	24.10
Calcium.	Ca.	II.	39.76
Strontium.	Sr.	II.	86.95
Barium.	Ba.	II.	136.39
Zinc Group.			
Zinc.	Zn.	II.	64.91
Cadmium.	Cd.	II.	111.10
Mercury.	Hg.	I, II.	198.49
Iron Group.			
Iron.	Fe.	II, III.	55.60
Cobalt.	Co.	II, III.	58.55
Nickel.	Ni.	II, III.	58.24
Ruthenium Group.			
Ruthenium.	Ru.	II, IV.	100.91
Rhodium.	Rh.	II, IV.	102.23
Palladium.	Pd.	II, IV.	105.56
Osmium Group.			
Osmium.	Os.	II, IV.	189.53
Iridium.	Ir.	IV.	191.96
Platinum.	Pt.	II, IV.	193.41
Scandium Group.			
Scandium.	Sc.	III.	43.78
Yttrium.	Y.	III.	88.35
Lanthanum.	La.	III.	137.59
Ytterbium.	Yb.	III.	171.88

In addition to the above, a number of other substances are sometimes enumerated among the elements, but on account of the uncertainty of their elementary nature, or of their place in the periodic system, they have not been included here.

Strictly speaking, the above groups are sub-groups of the periodic system.

Formulas, Subscripts and Coefficients.—Compound molecules are represented by writing in a group the symbols of the atoms which they contain, as HCl , KOH , FeS , etc. Such a group of symbols is known as a *Formula*, and represents one molecule of the compound.

In the examples just given, each molecule contains only one atom of each element represented, but in the case of perhaps a majority of the substances dealt with by chemists, the molecules contain more than one atom of the same kind. For example, the nitric acid molecule contains one atom each of hydrogen and nitrogen and three of oxygen. How should its formula be written? One way would be to repeat the symbol as many times as the oxygen atom is contained in the molecule, as HNOOO , but a better method, and the one adopted by chemists, is to make use of a numeral to indicate the number of oxygen atoms and write the formula HNO_3 .

A number used in this way is known as a *Subscript* and applies only to the particular symbol to which it is attached, and to no other.

When it is desired to represent more than one molecule of a compound, the numeral is placed before the formula which it multiplies, as $2\text{H}_2\text{O}$, 4HNO_3 , $3\text{H}_2\text{SO}_4$. A number used in this way is called a *Coefficient*, and multiplies the entire formula, e. g., 2HNO_3 means two molecules, each having the composition represented by HNO_3 .

Some chemists use coefficients to multiply atoms, as 2Cl , 2H , and subscripts to multiply formulas, as $(\text{HNO}_3)_2$, but the practice is not to be commended.

Symbols and formulas are not followed by periods, except when a word would be so followed.

Classification of Inorganic Compounds.—The large number of inorganic compounds at present known may be classified either according to the number of the elements in the compound, or according to the properties of the compounds.

Classed according to the first method there are *Binary*, or those composed of two; *Ternary*, or those composed of three; *Quaternary*, or those composed of four elements, etc.

Classified according to their properties, the three principal groups of inorganic compounds are *Acids*, *Bases* and *Salts*.

Notation of Binary Compounds.—Since a binary compound is composed of two kinds of atoms, its formula must consist of just two symbols, and since there can be no free or unsatisfied bonds in a molecule, the number of bonds of one element must be exactly equal to the number of bonds of the other.

If both elements have the same valence, the formula will show one atom of each, as NaCl , etc., but if they have different valences, the atom having the smallest number of bonds must be taken a sufficient number of times to equal the bonds of the other, as ZnCl_2 , FeCl_3 , HCl_2 , etc.

In each case the correct number of atoms can be found by taking such a number of each as will give the least common multiple of both valences. Suppose it is required to combine trivalent arsenic with bivalent sulfur. The least common multiple of two and three is six, to obtain which are required two atoms of arsenic and three of sulfur, or As_2S_3 .

It is customary to place the symbol of the metal or base first in the formula.

Nomenclature of Binary Compounds.—In the naming of compounds it is sought to give each compound such a name as will best express its composition.

The names of common inorganic compounds usually consist of two words, the first derived from the metal or base, and the second from the non-metal or acidic element.

The second word of the name of a binary compound consists of the name of the non-metal with its ending changed to -id (or -ide). The same termination, id (or ide) is also used in a few ternary compounds, which will be given later consideration.

If the metal or base does not commonly form more than one class of compounds, its name is used unmodified

as the first word of the name of the compound, as *sodium* chlorid, *calcium* oxid, etc. If the metal does commonly form more than one class of compounds, the terminations -ous or -ic are used to indicate which class the compound belongs to, as *mercurous* chlorid, *mercuric* iodid, *ferrous* sulfid, etc.

Some chemists depart from this rule by using the termination -ic in connection with elements which commonly form only one class of salts, as *baric* chlorid, *plumbic* chlorid, etc., but the general rule is as given above.

Acids, Bases and Salts.—Classified according to their properties the three chief divisions of inorganic compounds are *Acids*, *Bases* and *Salts*. Any of these may be either binary, ternary or quaternary.

Acids are compounds containing hydrogen which can be replaced by a metal, have, when soluble, a sharp, sour taste, and the property of changing the color of the blue dye Litmus to red. Such a change of color is known as an "acid reaction." Acids are mainly compounds of the non-metals.

Bases are compounds which can neutralize acids by replacement of their hydrogen, have, when soluble, a caustic, disagreeable taste, and possess the property of restoring the blue color to Litmus, which had been reddened by acids. This color change is known as an "alkaline reaction." Bases are chiefly compounds of the metals.

Salts are the compounds which are formed when bases and acids neutralize each other. They consist, usually, of the metal of a base combined with what remains of an acid after the removal of all or a part of its hydrogen.

All acids contain hydrogen, while nearly all bases contain a metal. Though hydrogen is present in all acids, it is itself basic in character. The acid qualities are due to the non-metal with which it is combined. The terms acid and base are relative. A given compound may act as a base toward some substances, and as an acid toward others.

Nomenclature of Acids.—Acids which do not contain oxygen are known as *Hydrogen acids*, or simply as *Hydrides*. All others are known as *Oxygen acids*, or *Oxacids*.

The hydrogen of an acid which can be replaced by a metal is known as *basic hydrogen*. Acids with one atom of basic hydrogen are called *mono-basic*; with two atoms, *di-basic*; with three, *tri-basic*; with four, *tetra-basic*.

It is customary to write the basic hydrogen of an acid at the beginning of the formula, as HCl , H_2S , HNO_3 , though this is not essential.

Two methods of naming acids are in common use. According to one method they are regarded as salts of hydrogen and named like other salts, as *Hydrogen chlorid*, and *Hydrogen sulfat*. The other method calls especial attention to their acid character by including the word acid in the name. Named in this way the two preceding compounds would be called *Hydrochloric acid* and *Sulfuric acid*, respectively.

Theory of Salts.—Many of the compounds known as salts may be formed by direct combination of their elements, but theoretically they may all be regarded as resulting from the reaction of a base with an acid.

In most cases when an acid and a base act upon each other, the basic hydrogen of the acid is driven out, and its place taken by an equivalent of the metal of the base, the oxygen and hydrogen of the base being likewise eliminated. Thus the reaction of sodium hydroxid, NaOH , with hydrochloric acid, HCl , would form the salt NaCl , and not NaOHCl .

In a few cases, however, a base and an acid may unite directly without the elimination of any of their atoms. An example of this kind is seen in the combination of ammonia, NH_3 , and hydrochloric acid, HCl , to form ammonium chlorid, NH_4Cl . This also represents the general method of formation of the salts of the alkalis in organic chemistry. An acid oxid may also unite directly with a basic oxid to form a salt, as BaO with SO_3 , to form BaSO_4 .

Nomenclature of Salts.—Salts are commonly divided into *Normal*, *Acid*, *Double* and *Basic*.

A *Normal salt* is one in which all of the basic hydrogen of the acid has been replaced by a metal, as NaCl , CaSO_4 , Li_3PO_4 , K_2FeCy_6 , etc.

An Acid salt is one in which only a portion of the basic hydrogen has been replaced, as NaH_2PO_4 , Na_2HPO_4 , etc. A mono-basic acid cannot, of course, form an acid salt.

A Double salt is one in which either two bases are united to one acid radical or two acid radicals to one base. An example of the first kind is seen in Rochelle salt, which is $\text{NaK}_2\text{C}_4\text{H}_6\text{O}_6$, one atom of hydrogen being replaced by sodium and one by potassium. An example of the second kind is $\text{PbCl}_2 \cdot \text{PbCO}_3$.

Basic salts are frequently very complex. Probably the best view the beginner can take of them is that they are combinations of a normal salt with an acid or hydroxide,

as Basic Zinc Carbonate, $3\text{Zn}(\text{OH})_2 \cdot \text{ZnCO}_3$, the two compounds being separated by a comma.

In connection with the foregoing facts it should be noted that salts of the binary acids all have the termination *-id* (or *-idr*).

That salts of acids ending in *-ous* always have the termination *-ite*.

That salts of acids ending in *-ic* always have the termination *-ate*.

That when an acid has a prefix, as hypo-, thio-, per-, etc., its salts have the same prefix. The hydracids are an exception, the prefix *hydr-* being usually omitted from the salts, except in the case of their compounds with the alkaloïds.

JUNIOR COURSE. LECTURE No. 4.

Pharmaceutical Physics.

Newton's Laws of Motion. Properties of Matter.

The Newtonian Laws of Motion.—More than two centuries ago Sir Isaac Newton enunciated the three laws which bear his name, and which have played an important part in the development of our present knowledge of energy and of the properties of matter. A modified statement of these laws is given below.

First Law of Motion.—A body at rest will remain at rest, and a body in motion will continue in motion, at uniform velocity, and in a straight line, unless acted upon by some external force.

This is frequently known as the Law of Inertia. By inertia is meant the passiveness or inactivity of an inanimate body, or its inability to change its own condition, whether that condition be one of rest or of motion.

That a stone lying upon the earth will remain there until acted upon by some other force is a familiar fact, but that a body set in motion should continue until stopped by some external force seems at first contrary to both reason and experience.

A ball rolled upon the earth soon comes to rest. Upon a hard pavement it will roll much farther, and if rolled with the same force upon smooth ice, it will continue to a still greater distance. The less the friction, the longer it will continue in motion. If all friction could be removed, no reason can be alleged why the motion should not continue forever.

Such conditions can not be met on the earth, but in space we have the examples of the heavenly bodies, which have not within historic times lost a perceptible amount of their motion. That their orbits are curved instead of straight is owing to the attraction of other celestial bodies.

Second Law of Motion.—Change of motion is in the direction in which the external force acts, and is proportional to its intensity and the time of its action.

Two consequences flow from this law:

(1) That a body, no matter how great its mass, if free to move, can be set in motion by the slightest unbalanced force. A child could move a mountain if it were suspended like a pendulum.

(2) That a given force will always have the same effect in producing motion, whether the body upon which it acts is influenced by other forces at the same time or not. As a consequence of the latter statement, a ball fired from a rifle and one dropped from the muzzle at the same instant should both reach the ground at the same time, otherwise the effect of gravitation must have been arrested by the flight of the projectile.

Third Law of Motion.—Action and Reaction are Equal and in Opposite Directions.

This is equivalent to saying that there is no such a thing as a one-sided force, or a force acting in one direction only. A nail attracts a magnet as much as the magnet attracts the nail. A wagon draws back upon the horses as much as the horses draw upon the wagon. An apple attracts the earth as much as the earth the apple. In the last example the attraction may seem to be one-sided, but this is only owing to the great disproportion of mass. The earth no doubt moves to meet the apple, but its motion is as much less than that of the apple, as the mass of the latter is less than that of the earth.

The Properties of Matter.

Classification of Properties.—For convenience of study it is useful to divide the common properties of matter into two general classes: Universal or Essential, and Specific or Non-Essential, Properties.

Universal or essential properties are such as belong to all matter in common, and from which it could not be dispossessed without destroying matter as we know it, such as Gravitative Attraction, Extension, Indestructibility, Impenetrability, Inertia and the like.

Specific or non-essential properties are such qualities as any given portion of matter may or may not possess, and which may vary greatly, even in different parts of the same substance. Examples of specific qualities are Malleability, Ductility, Tenacity, Hardness, Brittleness, Density, Divisibility, Color, etc.

Inasmuch as an understanding of many of the preceding qualities is of importance in pharmacy, they will be considered somewhat in detail.

Gravitative Attraction.—By experience it is learned that all bodies upon the earth are attracted toward it with a force varying with the quantity of matter they contain. By comparing the action of this force upon the earth with the motions of the heavenly bodies, Newton discovered that the same law prevails throughout the solar system, and formulated the celebrated law of Gravitation, that every material particle in the universe is attracted by every other material particle with a force which varies directly as the products of the attracting masses, and inversely as the square of their distance apart.

As the attraction varies directly as the product of the masses, doubling the mass of one of the bodies doubles the attraction, doubling the masses of both bodies, increases the attraction four times.

Since the attraction varies inversely as the square of the distance between the bodies, doubling the distance reduces the attraction to 1-4th, trebling the distance would reduce it to 1-9th, etc.

Center of Mass or Centroid.—Every separate particle in a material body is acted upon independently by gravity. The sum of these separate attractions operates like a single force whose attachment is located at one particular point variously known as the center of mass, center of gravity, or centroid.

So far as the action of gravity is concerned, a body behaves as if its entire substance was located at its centroid. (Fig. D).

When a body is permitted to fall it passes along a straight line, joining its centroid with the centroid of the earth. This is the "line of direction."

Equilibrium and Stability.—A body left to itself always assumes such a position as will bring its centroid as low as possible, hence to support it is to provide a support for its centroid, or to so place the body that



Fig. 1.—Centroid and Line of Direction.

its line of direction will pass through the base on which it rests.

According to the tendency of a body to stand or fall, we distinguish three degrees of stability or equilibrium, known respectively as *neutral*, *unstable* and *stable*.

Neutral equilibrium is where the body is so supported that its centroid is neither raised nor lowered by a change of position. Such bodies tend to remain wherever placed, as a perfectly balanced wheel on its axle, (Fig. 2), or a sphere of uniform density, resting upon a plane surface.



Fig. 2.—Neutral Equilibrium.

Unstable equilibrium is where a body is in such a position that a change of position would lower its centroid, since in that case the body would have no tendency to return to its first position. Such

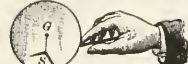


Fig. 3.—Unstable Equilibrium bodies are easily overturned. (Fig. 3).

Stable equilibrium is where a body is so supported that a change of position would raise its centroid. In this case the body will tend to return to its position after each disturbance. (Fig. 4).



Fig. 4.—Stable Equilibrium.

The higher the centroid of a body must be lifted in order to overturn it, the more stable it is. Consequently the wider the base of a body, the greater the arc through which its centroid must be lifted to overturn it and consequently the greater its stability. (Fig. 5).

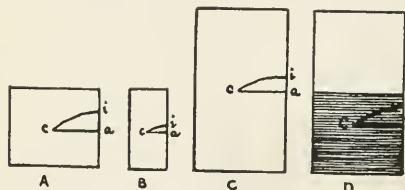


Fig. 5. Illustrating Relative Stability.

Extension.—By extension is meant the space-occupying qualities of matter.

A mathematical line has extension in one direction only, and a mathematical surface in two directions only, but every particle of matter, even the smallest conceivable, has extension in three directions at right angles to each other, or "length, breadth and thickness."

Relation of Gravitation to Weight.—According to the law of gravity, bodies on the earth's surface are attracted not only by the earth, but also by every other material body in the universe, but on account of its greater mass, the earth's attraction overshadows all other attractions, and causes the phenomenon of weight. This weight is the measure of the earth's attraction, or rather of the excess of the earth's attraction over the attraction of other celestial bodies.

Weight is not uniform over the earth's surface, but varies with the latitude.

In transporting a body from the pole to the equator it would lose in weight from two causes: (1). The equatorial diameter of the globe is about 43 KM. greater than the polar diameter, consequently the distance of the body from the earth's centroid at the equator would be increased and the force of gravity weakened. The

amount of this weakening is estimated to be $\frac{1}{568}$ of the weight at the pole. (2). In consequence of the greater velocity of the equator, (about 1,040 miles per hour), centrifugal force lessens the action of gravity to an amount estimated as $\frac{1}{280}$ of the effect at the poles.

The conjoined effect of these two causes is to make a total reduction of $\frac{1}{192}$ of the polar weight, i. e., a

man weighing 192 pounds at the pole would weigh only 191 at the equator.

Measurement.—Measurement is comparison, and consists in comparing the thing to be measured with some particular unit selected as a standard. The standard unit must be of the same kind of measure, i. e., linear measurement must be made with standards of length; volume measure with standards of volume, and weight with standards of weight.

Measurements may be either of matter, motion, force or energy. Matter may be the subject of as many kinds of measurement as it has distinguishable properties. For common purposes, however, and especially for the purposes of the pharmacist, the only properties of matter which are made the subject of measurement are those of extension and mass.

Measurement of Extension.—The measurement of extension in one direction is linear, or long measure. Measurement in two directions at right angles to each other is surface or square measure. Measurement in three perpendicular directions is volume or cubic measure. The unit of surface is the square of a linear unit, and the unit of volume, the cube of a linear unit.

Measurement of Mass.—The quantity of matter in a body, or its mass, is commonly estimated by weight, since at the same place on the earth's surface, the masses of bodies are proportional to their weight. The weight of a body, however, is something quite different from its mass, inasmuch as the latter is a permanent quantity, while its weight, as previously stated, will vary at different parts of the globe.

Metric System of Weights and Measures.—The system of weights and measures recognized by the United States Pharmacopoeia, and used by nearly all of the civilized nations of the earth, is known as the Metric System. Its advantages over other systems are so many and so great that it is only a question of time when its use will be universal, and a knowledge of it essential, not merely to the scientific worker, but to every one who has any connection with trade or commerce.

No one can know the metric system until he has learned to think in metric terms. The more commonly used metric units are given in the table below, and the various illustrations and problems of the subsequent pages will be given in metric terms.

A more complete exposition of the subject will be given under Pharmaceutical Processes.

Fundamental and Primary Units.—The fundamental unit of a system of weights and measures is the unit upon which the entire system is based, and from which all its other units are derived. The fundamental unit of the metric system is the earth's meridional circumference, or the length of a great circle passing around the earth from north to south.

The units upon which the measures of length, surface, volume and weight are severally based are known as the Primary units of their respective kinds of measure.

Metric Units in Common Use.—The metric units of weight and measure used most frequently in these lectures are as follows:

Measures of Length.

The Meter. Abbreviated M. Approximately equal to 39.37 inches.

The Decimeter, one-tenth of a meter. Abbreviated dM. Approximately equal to 4 inches.

The Centimeter, one-hundredth of a meter. Abbreviated cM. Approximately equal to 0.4 or 2.5 inch.

The Millimeter, one-thousandth of a meter, or 1-10 cM. Abbreviated mM. Approximately equal to 0.04 or 1-25 inch.

Measures of Capacity.

Liter. Abbreviated L. Approximately equal to 33.81 fluid ounces.

Cubic Centimeter, the cube of a centimeter, or 1-1000 of a liter. Abbreviated Cc. Approximately equal to 16 minims.

Measures of Weight.

The Kilogram. Abbreviated KGm., or kilo. Approximately equal to 32 oz., 72 grains Troy.

Gram, the one-thousandth of the KGm. Abbreviated Gm. Approximately equal to 15.43 grains.

Milligram, the one-thousandth of the Gm. Abbreviated mGm. Approximately equal to 1-64 grain.

The four primary units of the metric system are the Meter, Are, Liter and Gram.

The words meter and gram are pronounced as spelled. Liter is pronounced *le-ter*. In writing metric quantities the numerals are placed before the units, as 10 Gm., 25 Cc., etc. The student should also note the fact that a cubic centimeter of water weighs one gram, and conversely that a gram of water measures one cubic centimeter.

Practical Studies.

(1) **To Find the Centroid of a Body.**—Tie a tack to a string, stick the tack into a potato and suspend as in Fig. 6. The line *a c n* prolonged is the "line of direction." Next suspend by inserting the tack at *s*, the line *s b c* is now the line of direction. Where these two lines cross, *c*, is the location of the centroid. Repeat the experiment, using a chair, block of wood, box, etc.

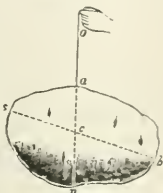


Fig. 6.—To find Center of Gravity.

(2) Practice with Metric Units.

—Using Fig. 7 as a pattern, cut a piece of paper the size of the large square. This is 1 dM. on each side, or one square dM. Using this paper as a pattern, measure off with it one meter, on a cord or stick, the latter preferred. With the aid of the measured stick or string, make the following measurements:

(3) Determine your height, waist measure, throat measure and wrist in meters and centimeters.

(4) Make a diagram of the store room, showing loca-

pieces of card board of equal size, and with the aid of paper and mullage, paste them together in the form of a box open at one side. What is the capacity of this box?

(6) Fill the box with sand or sawdust, and pour the contents into a wide mouthed bottle. Level the surface, and mark the level by pasting on a strip of gummed paper. Empty the bottle and fill to the mark with water. If your work has been correct, how many Gm. does this quantity of water weigh? How many Cc. does it measure?

(7) Proceeding according to the methods given, prepare a permanent meter stick, marked in decimeters and centimeters, also a permanent liter measure of glass. A wide mouth bottle will do for the latter.

These measures will, of course, not be exact, but they will help to familiarize the student with the relations of the several units, and to give him an appreciation of their value. If possible, the student should supply himself with a set of metric weights and measures, which may now be purchased very cheaply.

PYRANTIN is a new antipyretic prepared by Plutti. Its chemical composition is that of p-ethoxy-phenyl-succinamide. The pure substance is in lustrous prisms, which melt at 155° C. It is sparingly soluble in water and ether, more readily soluble in alcohol and acetic acid. The sodium salt of pyrantin is very soluble in water and has a sweet taste. A number of physiological experiments have shown a decided sedative and antipyretic effect in higher animals, without unpleasant action, even in large doses. It is eliminated in form of phenetidin and succinic acid. In the lower forms of animals it causes paralysis, when given in large doses. (Ap. Ztg.)

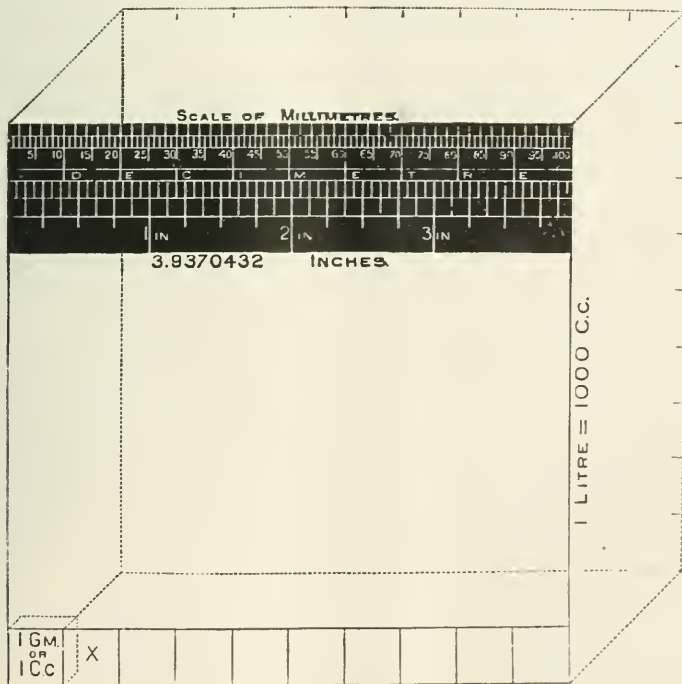


Fig. 7.—Metric Diagram—Comparison of Measures of Length, Capacity, Weight.

tion of counter, shelving, etc. Mark on the diagram the dimensions in metric units, of the room, counters, shelving, doors, windows, etc.

(5) Using the square piece of paper again, cut five

TO RENDER SULPHURETTED HYDROGEN GENERATORS ODORLESS, Dr. Hefemann recommends adding a solution of chlorinated lime. It is also advisable to expose chlorinated lime about the rooms in which the gas is generated. (Ph. Rdschau.)

THE PHARMACIST AND THE LAW.*

HIS LEGAL RELATIONS TO SOCIETY AND TO THE STATE.

By WARD N. CHOATE, Esq.,

Member of the Detroit Bar.

We come next to the civil duties and liabilities of the druggist. For while the law lays down certain rules and provides certain penalties, in order to protect the public at large from ignorant and unskilled pharmacists, it does not relieve the druggist, though he comply with all these regulations, from his civil liability for any injuries that his carelessness or negligence may occasion. It, in fact, holds him to a higher degree of care than it does the ordinary man, for in our general relations towards other men the law only requires of us that degree of care which an ordinary man would use under the same circumstances. "But of a druggist," as an eminent jurist has said, "a very high degree of care may justly be required. People trust not only their health but their lives to the knowledge and prudence of druggists, and in many cases a slight want of care is liable to prove fatal to some one. It is therefore proper and reasonable that the care required shall be proportioned to the danger involved."

Before going further into the question of the liability of a druggist for negligence and what negligence is, I wish to call attention to his contractual obligations towards his customers in general. It is a general rule of law that one who sells an article for a particular purpose warrants it to be the article called for and suitable for that purpose. For example, a retailer of provisions impliedly warrants his goods as being wholesome and fit for food. If the butcher sells a steak he impliedly warrants it to be wholesome and fit to be eaten. This is true because it is common to every one that the customer of a grocer and a butcher buys provisions or meat for the purpose of using them as food. (See as illustrating these principles, 1 Stark, 384; 2 Camp, 391; and 3 Camp, 286.) It is apprehended that this rule applies to a certain extent to the sales of a druggist; but only to this extent—that is, to the sale of such drugs and medicines which in the common course of trade he may be presumed to know are bought for particular uses. For example, in the sale of quinine he would be expected to know that in the ordinary course of affairs the quinine was to be taken internally as a medicine. He would therefore impliedly warrant that the article put up and dispensed was quinine and quinine suitable to be used as medicine. But this rule has its important limitations, for not all chemicals and drugs that are sold and dispensed are used for medicine, nor is it always plain whether it is the intention of the customer to use them externally or internally, for man or beast. It is perhaps an unconscious recognition of this rule of law, at least a safeguard against it, which makes it such a common practice for the druggist to inquire, either directly or indirectly, what his customer intends to use the purchased article for, and especially so with regard to poisons and dangerous drugs or chemicals.

Substitution not Permissible.

It is a primary rule of trade and so recognized as elementary in law that a customer is entitled to have the precise article he calls for, and if another is furnished as a substitute and any injury results, the party injured has a right to seek redress from the seller. And it is submitted that this is especially true of physicians' prescriptions. When a customer brings to a druggist a physician's prescription, the druggist in agreeing to fill the prescription undertakes to furnish the identical articles and in the same amounts that the prescription calls for, he also undertakes to furnish such articles as would be fit for the evident purpose of the prescription, and he further undertakes to use such degree of skill and care in compounding the prescription as is ordinarily used by druggists and pharmacists generally in the locality where he carries on his business. He must not substitute, for if he does and harm results he would become liable for the damages or injury occasioned by his substitution. Nor may he use deterio-

rated chemicals or worm-eaten or inert drugs. Therefore it must follow that if a certain manufacturer's goods are called for and he supplies the goods of another manufacturer and the patient suffers from the substitution, the druggist makes the substitution at his own peril and may be made to pay the injured party damages for any injuries occasioned by the druggist's wrongful act. This question of substitution, because most probably of its difficulty of detection, has received comparatively little attention by the courts, and as far as I have been able to find, has not been judicially passed upon. A druggist also warrants the goods he dispenses to be as labeled.

Accidents from Carelessness.

These same questions arise more frequently as a tort, a wrong due to the carelessness of the druggist or his negligence. The reason for this is that the damages recoverable in an action of tort for a careless or wrongful act are usually larger than are those recovered in actions based upon the contractual relations of druggists and their customers. In common parlance it is a distinction without a difference—legally it is a very important distinction.

First, it is necessary to understand what negligence is, to get some general idea of what is meant by the legal term negligence. Negligence consists of a want of that reasonable care which would be exercised by a person of ordinary prudence under all the existing circumstances. It is the failure to observe that degree of care which the law requires for the protection of the interests likely to be injuriously affected by the want of it. In other words, negligence is neither more nor less than a failure of duty. And when there is negligence that results in injury and damages to any one, the law will require the one at fault to pay to the injured party such damages. But it might be added, it is far easier to define negligence than to apply the definition, and for the purposes of this article it is thought best to refer to particular cases, keeping in mind that negligence is after all but a comparative term, to be determined from the facts and circumstances of each particular case.

The leading case on this subject, and a careful study of which would repay every druggist, is that of *Thomas vs. Winchester*, 6 N. Y. 397. While the case decides but one or two points, it discusses and lays down the law applicable to druggists generally in a very satisfactory manner. The defendants were engaged in putting up and vending certain vegetable extracts. On an order for extract of dandelion from a New York druggist they sold him a jar labeled "Extract of Dandelion," but which really contained extract of belladonna. This druggist afterwards sold the jar to another druggist, who filled a physician's prescription for extract of dandelion with the extract of belladonna, and the plaintiff, to whom it was administered, was greatly injured. The plaintiff obtained a verdict for \$800.

Chief Justice Ruggles, in delivering the opinion of the Appellate Court, said: "The death or great bodily injury of some person was the natural and almost inevitable consequence of the sale of the belladonna by means of the false label." The further opinion of the court would lead to the conclusion that had the plaintiff died the defendant would have been guilty of manslaughter.

The case really decides that a dealer in drugs and medicines, who carelessly labels a deadly poison as a harmless medicine and sends it so labeled into the market, is liable to all persons who, without fault on their part, are injured by using it as such medicine in consequence of the false label. The liability of the dealer in such cases arises, not out of any contract or direct privity between him and the person injured, but out of the duty which the law imposes upon him to avoid acts in their nature dangerous to the lives of others. He is liable therefore, though the poisonous drug with such label may have passed through many intermediate sales before it reaches the hands of the person injured (*Thomas vs. Winchester*, 6 N. Y. 397, *ibid.*). And it is the general rule that where an act of negligence is eminently dangerous to the lives of others, the guilty party is liable to any person injured thereby, whether there exists any privity between them or not. Otherwise the negligent party is liable only to the person with whom he contracts (*Walt's Actions and Defenses*, 4,707.).

* Portion of a series of articles on Pharmaceutical Jurisprudence appearing in the Bulletin of Pharmacy.

If an apothecary or his clerk negligently sells a deadly poison (laudanum) for tincture rhubarb, a harmless remedy, to one man, who buys it to administer to another man, and the latter dies from the medicine, the dead man's personal representatives have a right of action against the apothecary (*Norton vs. Sewall*, 106 Mass., 143.). Druggists have been held liable where laudanum has been sold, labeled "Paregoric," where the latter was called for, and for supplying sulphate of zinc when Epsom salts were asked for, and tartaric acid where Rochelle salts were for. Where a druggist either by himself or his servant, who is not a registered pharmacist, sells extract of belladonna for extract of dandelion, the druggist is liable to the purchaser injured thereby, (*Smith vs. Hays*, 23, Ill. App., 244.). It may be said that in general a druggist who delivers one medicine when another is called for is responsible for the consequences on the ground of negligence only, and actual negligence of the defendant, independent of the prima facie negligence shown by the fault of the delivery of a wrong drug, must be shown (*Howes vs. Rose*, 13 Ind. App., 674.). If the error occurred without fault on the part of the druggist or his servants, the case is like one of inevitable accident and the druggist is not liable, though injurious consequences follow (see also *Brown vs. Marshall*, 47 Mich., 576.). It is submitted, as the opinion of the writer, that if the customer knew that the drug furnished was wrong, or if the druggist while supplying the wrong medicine labeled it correctly and explained the nature of the medicine to the customer and cautioned him about its use, the druggist would not be liable, but would be protected by the negligence of the customer contributing to the injury. It would, however, be no defense to the druggist that the case was negligently treated (see last case).

One violating the Missouri Code, which forbids the sale of poisons to minors, is civilly guilty of negligence per se; but whether such negligent act makes him liable for the special damages sustained depends on whether it was the proximate cause of the injury, and it was held that the sale of chloroform by a druggist to a minor of years of discretion is not the proximate cause of his death from the use of the chloroform, though he was grossly intoxicated when the druggist sold it to him (*Meyer vs. King*, 16 So. (Miss.), 245.). In the case of *Fleet vs. Holakemp*, 13 B. Monr., 219, a druggist in compounding some medicine ground it in a mill which had been previously used for poisonous drugs and was not first properly cleaned, and he was held liable for negligence. The druggist is not, however, always liable, and it is a question which should properly be submitted to the jury. The case of *Wohlfahrt vs. Beckert*, 92 N. Y., 459, holds this principle in a very hard case. Black-drops had been supplied instead of black-draught. The court said: "Granting that by omitting to label a vial containing poison a druggist who sells it is guilty of a misdemeanor and liable to the penalty of the criminal law, the omission does not render him answerable (liable) to the customer injured, if he fairly and fully warned him of all and more than could have been made known by the authorized label." The court goes on to say in substance that where, however, in such a case the only evidence of such warning was that of the druggist's clerk who sold the poison, as the jury was at liberty to disbelieve him, he being an interested person, having violated the law by omitting the label, the question as to whether the warning was given is one for the jury.

In an action against a druggist for negligently giving him an injurious medicine, plaintiff to recover must show himself not guilty of contributory negligence; and it is error to refuse to charge the jury to the effect that if the medicine was not the proximate cause of the injury complained of, or if the plaintiff was ill at the time and taking the drug did not increase the illness, plaintiff is not entitled to recover, there being evidence of his illness at the time (*Rabe vs. Sommerbeck*, 63 N. W. (Iowa), 458.). Where sulphuric acid was dispensed and there was a dispute as to whether sulphuric ether or sulphuric acid was called for, and the drug was delivered without labeling it "poison" as required by law, it was held that it was negligence to sell such drug without the required label, but a question for the jury as to what was called for (*Fisher vs. Galloway*, 38 Mo. App., 531.).

The sale of an article (sulphide of antimony) on an order for black oxide of manganese, in itself harmless and which becomes dangerous only by being used in combination with some other article (chlorate of potash) without any knowledge by the vender that it is to be used in such combination, does not render him liable to an action by one who is injured while using it in dangerous combination with another article, although by mistake the article actually sold is different from that which is intended to be sold (*Davidson vs. Nichols*, 11 Allen, 514; 93 Mass., 514.).

One's Own Prescription and That of Others.

Where a druggist in good faith recommends a prescription not his own, but as that of another named person, and thereupon is ordered by his customer to fill it, and does so, charging only for the medicines and compounding them, he is not responsible to the customer for any damage which may result from the use or administration of the remedy by the latter. (*Ray vs. Burbank*, 61 Ga., 305.)

Joseph George went to a chemist and druggist by the name of Skivington once and purchased a chemical compound put up by the chemist, to be used in washing his wife's hair. It was too strong for a hair-wash and caused considerable injury to Mrs. George's hair and scalp, whereupon Mr. George sued the druggist, charging him with negligence and unskillfulness in making up said compound, and it was held that Mr. George had a good cause of action. (*George vs. Skivington*, L. R., 5 Ex., 1.)

Legal Prohibitory Regulations.

It is within the police power of the State to regulate the sale of opium (*State vs. Lee*, Mo., 38 S. W., 583.). And a law prohibiting any person not a licensed physician or pharmacist from having in his possession opium and certain other poisonous drugs, unless prescribed by a duly licensed physician, has been held constitutional as a proper exercise of the police power (*Luck vs. Sears* (Or.), 44 P., 693.). In the case of *Holleman vs. Harvard*, in the Supreme Court of North Carolina, it was held that an action for damages will lie at the suit of a husband against a druggist who, in violation of the express orders of the husband, has sold laudanum and similar preparations to the wife, in consequence of which she has become a confirmed subject of the opium habit, resulting in the loss of her services and companionship. Such a right of action has often been held to exist for selling liquor to any person after being forbidden so to do by a relative or dependent of the person, and the reasoning of the above case would point out a very clear liability where any other dangerous drug was sold against the express orders of one who would have the right to give such orders.

Under the prohibitory law, Kansas, 1887, Par. 2, providing that druggists "may" sell intoxicating liquors on proper application, such a sale is discretionary with the druggist, and in refusing to make such a sale he is not required to give a reason for his refusal; nor is he liable in an action for damages for such refusal. (*Treahy vs. Holliday* (Kan.), 22 P., 1044; 43 Kan., 29.)

In Louisiana, an apothecary on one or two occasions declined to fill a physician's prescription, and also at another time made use of expressions in public tending to create the impression of the physician's incompetency. He was held liable for the slander, but not for refusing to fill the prescriptions. The opinion of Justice Miller on the latter question will repay a careful perusal: "It appears that the defendant did decline to fill two prescriptions of the plaintiff. In one a patent medicine formed a component. In his own language as a witness, the defendant was unwilling to take the responsibility of such a prescription, as he was not sure of the composition of the patent medicine. . . . The general proposition affirmed by the plaintiff's case is, that a druggist is to be made liable to damages because he declines to fill prescriptions. We cannot assent to this view. In many cases the druggist may have had the best reason for declining. As a chemist he may perceive or have cause to suspect the physician erred in his prescription. Or the druggist may not have at hand the ingredients, or he may distrust his ability to prepare the prescription, or other causes may dissuade the druggist to undertake filling the prescription. Recognizing the room for all such causes, we cannot hold that the mere refusal of a druggist to fill prescriptions furnishes any occasion to hold

him for damages to the physician who gives the prescription. It does not appear from the testimony that, on a refusal to fill the prescription, the defendant used any language derogatory to the plaintiff. True, the father of the child for whom one of the prescriptions was given states the impression as to the plaintiff's professional capacity made on his mind by defendant's declining to fill the prescription was unfavorable. But it is quite certain no such impression could be derived from anything the plaintiff said, and an impression arising solely from the exercise of the defendant's right to decline to fill the prescription obviously furnishes no cause for the plaintiff against defendant." (Tarlton vs. La Garde, 16 So. (La.), 180.)

Much discussion has been had as to the

Ownership of the Prescription.

and it does not seem best for the purposes of this article to enter into this question. However, this deduction can be made from the foregoing case: The druggist may either insist on retaining the original prescription if he undertakes to fill it, or refuse to fill it. After he has obtained possession of the prescription, I know of no way it could be successfully taken from him. In Michigan it has been held that mandamus will not lie, at the instance of a private individual, to compel a druggist to allow the relator to examine the record of sales of liquor, which the druggist is required by the statute to keep, the same to be open for examination to all persons during business hours. It is submitted that the same line of reasoning would protect the druggist in his possession of a prescription, and it would be, most certainly, an easy matter to prevent any one from obtaining possession of a prescription held by a druggist. In Missouri, under a law requiring a druggist to keep all prescriptions, numbering, dating and filling them, and produce them before any court when thereto lawfully required, it is held that he cannot be required to produce all the prescriptions filed between certain dates, but only such as relate and are material to the case on trial or matter under investigation. (State vs. Bragg, 51 Mo. App., 334; State vs. Davis, 108 Mo., 666 and 117 Mo., 614.)

There are, of course, many questions peculiarly belonging to the druggist besides those which have been touched upon in this article, some of which have been before the courts and some of which have not; and the writer has only this to say in closing, that he has endeavored to pick out and use only such cases as would point out certain rights that the pharmacist has and his possible liabilities, and to show that the courts have looked upon the pharmacist as one who, like the lawyer and the doctor, has reposed in him by the public respect and confidence, and having accepted that trust, they hold him to a high degree of care in observing it.

FERMENTATION WITHOUT YEAST CELLS.*

PROF. BUCHNER.

About half a century ago Liebig, when studying the fermentation of yeast, made the prophetic utterance that the investigator who should be able to discover the true nature of the fermentation of yeast would likewise, at the same time, unveil the essential nature of infectious diseases. His prophecy came true; yet not he himself but his gifted scientific opponent, Pasteur, was the fortunate discoverer. Liebig had promulgated the theory that fermentation was a purely chemical process, whereas Pasteur was of opinion that the alcoholic fermentation of sugar was connected with the active life of the yeast fungus. His (Buchner's) discoveries would to a certain extent, rehabilitate the now almost universally discarded theory of Liebig. Liebig conceived all kinds of fermentation to be molecular motion, which a body whose molecules were in a state of motion, that is to say, of decomposition, transfers to other substances whose elements are not very firmly combined together. Pasteur was not satisfied with merely confuting the opinion of Liebig, but he attempted to substitute in its place another and a better theory, according to which it is the absence or scarcity of oxygen which causes the organisms to fer-

ment, and thus form the decomposition of complicated molecules to obtain the molecular force which otherwise they obtain through the process of respiration. Pasteur thus enunciated his doctrine, "Fermentation is life without air." This theory is, however, imperfect. It is very evident that this cannot include the fermentations since discovered, which do not take place except in the presence of oxygen, and the best known example of which is acetous fermentation. Certainly, the definition would now have to be couched in more general terms, viz., that fermentation consists in a decomposition of organic substances effected by the influence of living fungi. However, the investigations of the last 15 years, from 1880 to 1895, necessitate an alteration of the words "decomposition of organic substances." The study of the bacteria of leguminous tuers has made us acquainted with micro-organisms whose principal activity consists in combining with the free nitrogen of the air, and their chemical action is not, therefore, one of decomposition, but rather composition or synthesis.

Finally he (Buchner) had on April 25th, 1895, published before the Chemical Society (Chemische Gesellschaft,) at Berlin, the remarkable results of his investigations, extending over many years, concerning alcoholic fermentation; according to these he had succeeded in obtaining from the yeast-cells an expressed liquor, the so-called zymase, which was capable of starting the alcoholic fermentation of sugar. Through his experiments he was enabled to prove that in opposition to the universally prevailing opinion there exists fermentation unaccompanied by the presence of cells. Buchner, after having by means of many subsequents confirmed his opinion, finally came to the conclusion that: "The process of fermentation could not be accurately described as a physiological action; that it was rather effected by the presence of zymase, a substance similar to ferment, which, in nature, however, was only found in the living yeast cells. The preparation of this substance in a pure form is for the present not possible on account of its great instability and on account of the presence of the other ferments, it can only be obtained, by subjecting the yeast cells to a hydraulic pressure of more than 500 atmospheres, in the form of an expressed liquor containing zymase.

As might have been expected in a matter of such importance, many objections were raised, which, however, were experimentally confuted by Buchner. These objections were briefly as follows: First, that it was not the expressed liquor itself, but the micro-organisms contained in the same which set up fermentation; second, that the production of carbonic acid observed is not the result of alcoholic fermentation, but it is produced by some other cause; third, that the particles of living plasma present in the expressed liquor are the causes of its fermentive action. Many investigators who repeated his experiments had not been successful, according to his opinion, principally because the yeast was not thoroughly triturated and subjected to sufficient pressure, or because they had not selected the right sort of yeast, as not every kind of yeast is suitable for the production of the expressed liquor. In the case of certain methods of propagation at certain stages of their development even exceedingly strong ferment-producing fungi at times do not contain any zymase. Moreover, active pressed liquor by long standing loses its fermentive power, probably owing to the presence of ferments which decompose the albumen; also chemical substances adhering externally to the yeast, when the latter has not been carefully washed, may influence its action. Recently, however, the repetition by others of the experiments has been attended with more positive results, vide the reports of Will, Duclaux and others.

The speaker concluded with the words that it must be left to the future to define the exact boundary between living plasma and a fermentive substance, between the highest representatives of inorganic nature and the most rudimentary and elementary form of organic life.

TENALIN is a vermifuge prepared from the areca nut, and has been used successfully for tapeworms and ascariides in animals. The dose is a drop for each pound of body weight. The remedy is not free from toxic effects, and has not yet been used on human subjects. (Zisch. f. Pharm.)

* Translation and abstract of a paper read at the Third International Congress of Applied Chemistry, held at Vienna, July 27th to August 2d, 1898. (Fr. & Col. Dr.)

SIMPLIFIED ORTHOGRAPHY.*

By SEWARD W. WILLIAMS.

Query: "Should the American Association for the Advancement of Science rules for the spelling and pronunciation of chemical terms be adopted by the U. S. Pharmacopoeia of 1900?"

In explaining why the new spelling was not introduced in 1890, the Committee of Revision says:

"While some of the members, individually, were willing to approve and adopt at least some of these new spellings in their professional writings, the decision, so far as the Pharmacopoeia is concerned, was almost unanimously against their adoption at this time, it being deemed unsafe and unnecessary to inaugurate such radical changes, not yet generally accepted or followed in practice, in the names of medicines familiar, under their present garb, to so large a proportion of the population."

The Pharmacopoeia is forced by expediency to occupy a very peculiar position. A safe conservatism compels it to recognize in its titles existing usage in orthography and nomenclature to a degree which often sacrifices scientific accuracy and uniformity. The book follows professional custom to avoid dangerous confusion and, in turn, the profession follows the Pharmacopoeia as its standard authority. It is therefore difficult to tell which is leading and which following. The Pharmacopoeia records the survival of the fittest among remedial agents under titles familiar to the profession. Practical considerations naturally govern official titles, whereas the descriptive portion of the work is thoroughly scientific.

In introducing articles which represent a new class of official remedies, it is highly desirable that future usage be anticipated so far as practicable. Thus the Pharmacopoeia may adopt one member of a large class under the title in most common use at the time. During the next ten years a great many other members of the same class may come into general use in medicine. Manufacturers will naturally label all of these to accord with the single official representative of the class, notwithstanding that it may have been conclusively proven that the name adopted by the Pharmacopoeia actually belongs to a different compound belonging to a different class. The ultimate result will be a worse confusion than that which it was intended to avoid. Millions of labels and price-lists will be destroyed or changed when the matter is finally righted, and the now deeply-rooted custom of prescribers will have to be contended with for many years to come. The titles for the hydraclid salts of the alkaloids from 1870 to 1890, and the numerous labels based upon the established precedents, illustrate this point.

There are certain instances where the name belonging to one thing has so long been employed by physicians for another that it is doubtful if usage can be altered for a century to come. In fact neither the United States nor British Committees of Revision have considered it expedient to change some of the old names. The New British Pharmacopoeia still continues *Prunus virginiana* as the name for *Prunus serotina*. Individual cases of this kind are, however, of little importance compared with those influencing names of a large and rapidly growing class. When, in the judgment of the Committee of Revision, it is unsafe to make a change in orthography, the writer is inclined to accept the decision, without question, as a wise one. In all cases, however, where safety is not involved, it would seem desirable that the present usage of science, which, in all probability, will eventually become the usage of medicine and pharmacy, should be officially recognized at the earliest possible moment.

In reforms, the transition period is a trying one. If after careful study it is decided that the new spelling has enough force behind it to insure its permanence, it seems not unreasonable that the Pharmacopoeia should adopt it, in so far as can be done without causing dangerous confusion. In view of the fact that the Pharmacopoeia is our recognized authority and that manufacturers will not hesitate to label their preparations incorrectly or unscientifically if necessary to accord with it, it may naturally be argued that our pharmaceutical guide-book should follow only where it is dangerous to lead. Unless conditions of safety against mistakes forbid, it is certainly better that the Pharmacopoeia should be active rather than passive in the matter of orthography and

nomenclature—that it should mould usage, instead of being moulded by it.

The question of convenience perhaps presents greater difficulties in debating the adoption of the new spelling than does that of safety. Where safety is involved we, as pharmacists, agree at once to take no chances. In considering convenience, however, we may differ among ourselves, as well as with the prescriber. Suppose, for instance, that what we have known as anethol should be made official. The A. A. S. rules, which we are considering, require us to name this methyl allyl-phenol. Anethol would doubtless be given at least as a synonym title, and it is doubtful if the prescribers would ever take the trouble to write the longer name. Glycerin and resorcin, according to the new rules requiring the "ol" termination for alcohols, would have to be glycerol and resorcinol. Physicians will probably take less kindly to long terms, designed for class distinction or scientific preciseness, than to alterations which merely simplify orthography, and thus save them time and trouble. In some cases, as for example quinol for hydroquinone, both objects may be accomplished to everybody's satisfaction.

Fortunately the most marked changes do not affect official chemicals. As pharmacists we are not particularly interested in changes like that from phosphoretted hydrogen to phosphin. If we were, we might argue that confusion might result, because the name already belongs to an aniline dye. The action of the A. A. S. in retaining the longer spelling "gramme," despite the objections of phonetic reformers, will doubtless meet with the approval of practical pharmacists. The "me," while of no use at the end of a word like programme, is useful in preventing confusion, so long as the grain remains in use. It ought not to be possible for a fly-speck to divide a gram by fifteen, nor for ordinary copy to mislead the compositor in distinguishing between grain and gram.

It would simplify matters if the English and American chemical societies should adopt the new spelling proposed by the A. A. S. These societies are not yet in accord on all the points at issue. Take, for instance, the word anisol, which the rules under consideration change to methyl-phenate. If there were a conflict between the English and American chemical societies, on one hand, and the American Association for the Advancement of Science and several new dictionaries, on the other, agreement might be long delayed. The latter organization is fortunate in enlisting powerful influences which are doing much toward incorporating many of its new spellings as a part of the English language. Indeed, some enthusiast might recast our query to read: "Shall the Pharmacopoeia of 1900 adopt the English language of the future?" This, however, is perhaps too previous.

The Pharmacopoeia states that "in the choice of titles of official articles it is recommended that convenience, established custom and considerations of safety against mistakes, through similarity or changes in names, should outweigh purely theoretical consideration or scientific preciseness."

The proposed dropping of the final "e" in names of the alkaloids not only obliterates a useful distinction between basic and other organic principles, but may cause confusion of the changed names with those of certain resins or concentrations of eclectic medicine which differ from the names of corresponding alkaloids by just this final "e." The majority of the other changes recommended by the A. A. S., which interest us as pharmacists; for example, bromin, bromid, sulfate, sulfid, etc., would give rise to little or no confusion, and therefore, as being both convenient and safe, would seem eligible for admission to the Pharmacopoeia.

The objects of the A. A. S. rules are "essentially the attainment of uniformity in the orthography and pronunciation of the terms used" in chemical science. Incidentally the changes are largely along the line of phonetic reform, and have therefore been accepted by organizations working in this direction. If we accept certain of the more recent dictionaries as authority we may regard many of the new spellings as already a part of the English language. However, in so far as public

* Read at the annual meeting of the A. Ph. A., 1898.

safety may demand it, pharmacy may properly claim a right to a language of its own. New forms in spelling and nomenclature should give the best evidence of ultimate permanence before knocking at the door of the Pharmacopœia. If we look back to Chaucer's time, we will find that the language has been undergoing constant change, until the orthography of that period differs as much from that of the present, as may the phonetic spellings of the future.

As to change in pronunciation, this is of special interest to professors of pharmacy. The prescriber and dispenser deal mainly with the written language. The altered pronunciation quite naturally follows the changes in spelling, although it may seem to some that there need be no more difference between *id* and *ide* than between *ol* and *ole*. To infuse a little more practically into the discussion it may be said that in ordering drugs over a telephone the new pronunciation of sulfid might avoid a possible confusion with sulfite.

The writer is free to say that, from a pharmaceutical standpoint, he takes little interest in the new spellings; but, considering the action of the A. A. A. S. as virtually a part of the larger movement to simplify the English language, he is much interested as a plain citizen.

It is thought by some that, having attained liberty and unity, the nation is now entering upon an era of diffusion which shall carry our language to the uttermost parts of the earth. Indications were never stronger than now that English will eventually become the language of the world. These questions come to us citizens: Will not simplifying our language hasten the day? Are we not willing to inconvenience ourselves in the interests of our children and the spread of our language? If so, as professional men, we should think twice before refusing to co-operate and accept in our own field that portion of the proposed change which comes within its scope. In so far as we can do so without causing dangerous confusion.

Dr. C. F. Taylor says in the course of an editorial in "The Medical World," on "Shall we help to free ourselves and future generations from useless burdens in our orthography?"

• • • "If our spelling were rationalized, millions of dollars would be saved each year in the cost of literature. But much more important than that is the time wasted in learning our irregular, unsystematic and unreasonable spelling. It is a task that begins with our first day at school and ends only with death. As regards the stress which is laid upon verbal memory in school, the English speaking nations stand next to China. We have a few rules for spelling, but every rule is violated by about as many exceptions. All is irregularity, and the poor school children have to learn the spelling and pronunciation of each word individually, some letters having different sounds in different places, and the silent letters having no sound at all. This heterogeneous mass of irregularities and contradictions is an injury to the child's mind. Consistency, uniformity, regularity and constancy are nature's ways, therefore the ways of science. We doctors like to be scientific, but our spelling is most outrageously unscientific. We, of all others, should favor and aid in putting it upon a reasonable and scientific basis. It cannot be done, once we have done it, we favor an advance movement, and adopt the recommendations of learned societies that have given this subject careful and conscientious study.

"The leading objection to rational spelling is that the old forms carry with them the etymological derivations. These are very uncertain at best; but even granting all that is claimed for this, it is not nature's way. A tadpole dreads his shadow, and he has no wish to fly. A butterfly leaves the shell of its chrysalis when it takes flight. Nature does not carry useless burdens; why should we?"

The doctor says suppose a conservative should "propose gough for go! What would we think of it? Yet it would be just as reasonable as though ' for tho." It is needless to multiply illustrations.

* Graham, in his Introduction to Phonography and Phonotypy, says: "The couplet

Our life's dark couch my course I will pursue,
presents the combination ough with seven different sounds. It has another sound in the word bought. If a uniform pronunciation were given to the termination ough in each word, the first line of the above couplet would read in some of the following different ways:

"(Though) Tho the to co and hieco plo me thro.
"(Tough) Thuf the tuf and hieco pluf me thurf.
"(Cough) Thof the cof and hieco plof me thof.
"(Hicough) Thup the tup euf and hiecup plup me thup.

"(Trough) Thow the tow cow and hiecow plow me throw.
"(Through) Thoo the coo and hieco ploow me throo."

Dr. George M. Gould states in his Medical Dictionary that he has endeavored "as regards orthography to do what Prof. Whitney, in the preface of his great work, the Century Dictionary, says is the duty of the dictionary maker: 'The language is struggling toward a more consistent and phonetic spelling, and it is proper in disputed and doubtful cases to cast the influence of the dictionary in favor of this movement.' • • •

"Gradual, careful phonetic progress is a duty we all owe to our profession."

"In the spelling of certain chemie words," says Dr. Gould, "the advice of the A. A. A. S. has, as a rule, been followed, and seems to be in the line of cautious and wise progress. The unanimous acceptance and practice of all these recommendations by the American Medical Editors' Association constitutes a gratifying proof of progressiveness and freedom from irrational prejudice."

Having noticed that a number of the most carefully edited medical journals were paying no attention to the rules referred to, inquiry was made in regard to the matter, which brought out the following reply from the editor of a prominent New York medical journal:

• • • "I am utterly opposed to the peculiar spelling advocated by my good friend, Dr. Gould. As for the Association of American Medical Editors, so far as I know it does nothing but hold a banquet once a year. It has occasionally given out that it was going to do something more, but nothing has ever come of it to the best of my knowledge and belief. If it has ever taken action on the subject of spelling I am not aware of the fact, and most certainly I should not hold myself bound by such action."

In reviewing the New British Pharmacopœia, one of our ablest American pharmaceutical authorities, a gentleman whose influence is great and whose reputation is world-wide, says: "In nomenclature, it is a source of satisfaction that none of the so-called phonetic reformers have made any headway in the chemical names in Great Britain. We do not find 'fosforus,' 'sulfid,' 'bromin' or similar excrescences in the book." This is a conspicuous "straw indicating what way the wind is blowing" among authorities influencing the course of the Pharmacopœia.

Foster's Encyclopædic Medical Directory retains the old spelling, as does Lippincott's Medical Dictionary. On the other hand, the Orthographic Union says, in regard to chemical terms: "Spell, in general, according to the recommendations of the American Association for the Advancement of Science, adopted in 'A Standard Dictionary,' and largely in 'The Century Dictionary.'" The new spellings have been adopted, according to the Orthographic Union, in the following publications: Agricultural Chemistry, Wiley; Buffalo Medical and Surgical Journal; Chemical Analysis, Caldwell; Journal of Analytical and Applied Chemistry, Hart; Laboratory Exercises in Chemistry, Bartlett; Medical News; Qualitative Analysis, Beilstein—Ed. Curtman; Reactions, Flückiger's, Ed. Naglevoort; Science, New York; Systematic Mineralogy, T. Sterry Hunt, etc.

The Standard Dictionary states that "weight has been accorded the phonetic canon, write as you speak," and mentions two of the best chemical authorities in the country as endorsing its adoption of the A. A. A. S. rules for spelling chemical terms.

Among the pharmaceutical journals, the one first adopting the new rules wisely made an exception in retaining the final "e" for alkaloïds. Another adopted the rules in its educational section only. Some are waiting the action of the Pharmacopœia before paying any attention to the matter, while one prominent pharmaceutical journal and one important medical periodical strongly oppose the new spelling. Some dealers in chemicals have adopted the new rules, as evidenced by their price-lists. In fact there is a lack of agreement all along the line which looks to confusion.

It is a significant fact that the English and American chemical societies have not yet adopted the new spelling, although it may be said that certain of the new terminations, for instance "ol" for alcohols, are in accord with older rules of these societies. The journals of the English and American Chemical Societies continue the same orthography as before the rules of the A. A. A. S. were formulated. The editor of the journal of the American Chemical Society, although a member of the committee drafting the rules, says he has not thought it wise to adopt the new spelling in that journal as yet.

The chemical journals are naturally expected to lead the pharmacopœias in changes of the kind considered.

Authors of chemical and medical text-books will doubtless largely adopt the new spelling, as many already have done, and the influence of these works will naturally be reflected in the usage of graduates from high schools, scientific institutions, medical colleges and universities generally. Pharmaceutical graduates will be more largely influenced by the Pharmacopœia. The question is: Shall that work differ from the rest, except where conservative deviation is required to avoid a more dangerous confusion?

Among the agencies working for simplified orthography not already mentioned are the Philological Society of England, the American Philological Association, the Modern Languages Association and the Royal Geographical Society.

It may properly be observed here that if we are to be hampered with etymological entanglements we shall not be able to go far in the direction of phonetic spelling. Fosfate ought to be as good a word as sulfate, but etymology bars the way. James Russell Lowell is quoted as saying: "There is nothing more dangerously fascinating than etymologies. . . . The pedigree of an adjective or substantive is of little consequence to ninety-nine men in a hundred. . . . The important question is, what does the word mean now?"

Is our attachment for the old in orthography greater than it once was for the old systems of weights and measures? Who is there among us who will not feel like joining in celebrating the centennial of the metric system next Summer? The "Mouvement Geographique" of Brussels says: "In one hundred years the metric system has conquered the world." Might not something similar be said some time in the near future of the English language, if it were simplified as it might be, were we willing to sacrifice sentimental considerations and an unreasonable conservatism?

Many may argue that the English language is all right as it is, that its irregularities and redundancies afford valuable mental discipline, and that the proposed rationalization is revolutionary and a needless sacrilege. Selfishly speaking, our own peace and comfort favor conservatism. We have been initiated, and it's amusing to see the rising generation "ride the goat" that gave us such a shaking up. Obviously the question before us is not one of choice, but of obligation to posterity. The object of this paper is to present both sides in an unprejudiced way, merely urging the Association to a thoughtful consideration of its duty in the matter under discussion, regardless of personal preference.

Pharmacopœias are usually not pioneers in orthographical changes, for reasons already given. It is when altered words have come into general use that they are, as a rule, adopted by the pharmacopœias. If the American Pharmaceutical Association believes the new rules should be adopted, the surest course is to favor their general use in medicine and pharmacy, that they may at the earliest date become eligible for admission into the Pharmacopœia. A resolution favoring the new spelling and recommending its adoption, would perhaps influence the colleges of pharmacy and the pharmaceutical press to an extent that would insure a sufficiently general use by 1900, to warrant the recognition of the new spellings by the Committee of Revision at that date.

METHOD OF HARDENING GYPSUM.—Boric acid is dissolved in hot water and ammonia added to the solution. The product, which is very soluble in water, is mixed with the burnt sulphate of lime. If it be desired to harden only the surface of any object, it is sufficient to apply the solution to the outside. After two days the gypsum has completely hardened, and water is without influence upon it. Another method of hardening gypsum consists in the addition to the mass of finely powdered althea root, to the extent of 2 to 4 per cent. The more is added, the more the gypsum hardens, so that it may be sawed, filed or turned. (Südd. Ap. Zig.)

THE UNITED STATES PHARMACOPŒIA AND THE MEDICAL PROFESSION.*

BY F. E. STEWART, NEW YORK.

Last April I received a letter from the Chairman of this Section devoted to the educational interests of the profession of pharmacy as represented by the American Pharmaceutical Association, asking me to contribute a paper on the subject "Present a plan whereby the United States Pharmacopœia may be made more largely acceptable to the Medical Profession and recognized as an Authority in Medical Instruction."

I doubt very much whether the medical profession will ever accept the dictum of the Committee of Revision as to what physicians shall or shall not prescribe in the treatment of the sick. Drug therapy is founded for the most part upon inconclusive experiments, for there is no way of determining the true therapeutic value of a drug with sufficient exactness to settle its place in the *Materia Medica* once for all. From a therapeutic point of view therefore, it is not likely that the Pharmacopœia will ever attain that authority in medical instruction so much desired and so much desirable; but it may and should become authoritative in regard to standards of strength, quality and methods of manufacturing every preparation of medicine described in it which the physician prescribes.

To make the Pharmacopœia more largely acceptable to the medical profession, it should follow the profession and not attempt to lead it; for thus it will gradually win its way in professional favor, and become of more influence in the long run for the guidance of professional thought. By placing in the Pharmacopœia information that physicians desire and are entitled to have in relation to the source, composition and method of manufacture of medicinal products, they will become interested in the Pharmacopœia and purchase it as a work of reference. Practically, however, physicians as a rule are so poorly educated in pharmacologic science that much of the information of this nature is unassimilable to many of them. A higher standard of instruction in pharmacology should therefore be adopted for our medical schools. I use the word "pharmacology" not in its restricted meaning as applied to physiological activities of medicinal substances, but in its wider meaning as embracing the science of drugs, including *materia medica*, pharmacy and therapeutics.

An obstacle which has stood in the way of making the United States Pharmacopœia more largely acceptable to the medical profession, has been the misunderstanding with regard to our patent and trade-mark laws as related to medical science and its associated arts. The patent law was devised for the very purpose of promoting progress in science and the useful arts, and rewarding those engaged in original research. A patent is a grant upon the part of the people to the inventor of a new and useful invention displaying a greater amount of skill than is naturally to be expected from those skilled in the art to which the invention pertains, or is the more nearly related. The inventor is granted the right to prevent others from copying his invention for a limited number of years, in exchange for the publication of full knowledge of the invention, whereby it may be practiced by the public after the patent expires.

The knowledge of the invention becomes at once public property and may be used for the purpose of improving upon the invention or devising something more effective. Is there anything in the patent law, if properly applied to medical science and art, which should cause hesitation in making patented medicinal products official in the Pharmacopœia?

The Committee on Revision may say that the commonly-accepted names of many of the patented medicinal substances so largely prescribed by the medical profession are registered as trade-marks and are private property, and shall the Committee give the manufacturers of proprietary medicinal substances monopolized indefinitely in this manner, gratuitous advertising in the Pharmacopœia by making these products official?

Inventors who publish their inventions for the benefit of science by patenting them should be rewarded by having a place given their products in the Pharmacopœia, but the trade-mark system referred to has been standing

* A. Ph. A. Paper.

as a blockade in the way of it. It seems to me, however, that the United States Supreme Court has pretty well destroyed this blockade, so that patented medicinal substances may now be properly admitted into the Pharmacopoeia and recognized therein under their commonly accepted names. The Singer Sewing Machine Company registered the word "Singer" as a trade-mark on sewing machines, but it availed nothing when the validity of their trade-mark was called in question, for the United States Supreme Court decided that the word "Singer" was a generic term used to distinguish between different kinds of sewing machines, not a trade-mark serving to distinguish between different brands of the same sewing machine. The patent having expired, the public has a perfect right to use its commonly-accepted name when dealing in it, provided each manufacturer is careful to distinguish his brand of the Singer Sewing Machine in such manner as to prevent purchasers from being deceived in regard to the source of manufacture. As trees must have names to distinguish between them as to family, genera and species, so must every new thing placed on the market for sale have a name by which it may be recognized and dealt in.

The same principle was affirmed in the Castoria case. The word "Castoria" was used by the Centaur Company, not for the purpose of distinguishing their brand of a well-known article of commerce from another brand of the same thing, but to distinguish a certain medicinal preparation from all other medicinal preparations. The word "Castoria" therefore was not used as a trade-mark, but as an appellative.

The plan which I would suggest, whereby the United States Pharmacopoeia may be made more largely acceptable to the medical profession, and recognized as an authority in medical instruction is to include within its pages all of the patented medicinal substances which are generally prescribed by the medical profession, provided the formulas contained in the letters patent, that may be obtained from the Patent Office, are sufficiently clear to enable skilled chemists to reproduce the products, as required by the patent law. If the formulas are not correct as demanded by the law, the patents themselves are made void thereby, therefore the fact that they have been tested and found wanting by the Committee should be published for the benefit of all concerned. And each patented product made official should appear in the Pharmacopoeia under its commonly accepted name, either as the official title or associated therewith as a synonym.

FOSSIL FLOUR OR TRIPOLI.—Samples of white and salmon-tinted infusorial earths dug from the bottom of lakes and then prepared for market by drying in heated cylinders, have recently been analyzed by the chemist of the U. S. laboratory at this port, with the following results:

	Salmon-tinted sample, per cent.	White, sample, per cent.
Silica	90.44	95.36
Iron oxide and alumina.	3.18	3.31
Water and lime.....	6.38	1.30
	100.00	100.00

The refined or wrought earth represented by these samples is sold variously under the names "fossil flour" and tripoli. In an opinion recently rendered by General Appraiser Wilkinson in the matter of the protest of the importers, against the decision of the Collector of Customs as to the rate and amount of duties chargeable on the above merchandise, the following information regarding tripoli is quoted from Ure's Dictionary: Tripoli is a mineral of an earthy fracture, a yellowish grey or white color, composition impalpably fine, meager to the touch, does not adhere to the tongue, and burns white. M. Ehrenberg has shown that those friable, homogeneous rocks, which consist almost entirely of silica, are actually composed of the exuvie, or, rather, the skeletons of infusoria. They are recognized with such distinctness in the microscope that their analogies with living species may be readily traced, and in many cases there is no appreciable difference between the living and the fossil forms.

PERVIN is a meat extract containing iron, placed on the market in gelatin capsules.

PHARMACY.

ROVUSINE is a liquid for removing grease spots from cloth, composed of benzol, 84 p., water 65 p., alcohol 35 p., saponin 4 p., and essence of mirbane 2 p. (Rev. de Chim.)

FOR FETID BREATH.—The following solution has been recommended, as a mouth-wash in fetid breath:

Saccharin.....	15 grains
Sodium bicarbonate	
Salicylic acid.....	
Alcohol	4 fl. ounces

CHINESE WOOD OIL, an important product of China, is known in that country as "wood oil." It is produced from the seed of the *Alburites cordata*. This tree grows to the height of about 20 feet, and bears a green, fleshy fruit, about the size of an apple, which contains several large pits or seeds, from which the oil is expressed.

INCOMPATIBILITY OF RESORCIN AND OREXINE HYDROCHLORIDE.—These two substances, even when mixed with the greatest caution, form a slimy, sticky mass. There appears to be no chemical decomposition, since the resorcin may be sublimed from the mixture by simple warming; the orexine salt remaining behind. (L'Orosi, through Ph. Hdschau.)

PIMPINELLIN is a bitter principle obtained by Buchheim from the root of *Pimpinella saxifraga* as a crystallizable, nitrogen-free substance, melting at 97° C. It has been prepared by Hent in colorless needles, melting at 106°. It dissolves in sulphuric acid with a green color, and is easily soluble in a dilute potash solution with aid of heat. (Ap. Ztg.)

POTASSIUM IODIDE PILLS.—M. de Tolédo (L'Union Pharm.) gives a formula for preparing potassium iodide pills so that they keep perfectly: The iodide is powdered fine in presence of an equal weight of light magnesia. The mixture is made into a mass, with honey as excipient. The finished pills are kept in magnesia. Heavy magnesia is not suitable, as its absorbent power is insufficient.

QUININE WITH URETHANE IN SUBCUTANEOUS INJECTIONS.—According to Z. Gaglio a mixture of 1 Gm. of urethane, dissolved in 1 Cc. of water with aid of heat, forms a clear and stable solution well suited for hypodermic injections. The urethane cannot be extracted with ether, nor can the quinine be precipitated; the two are therefore chemically combined, the compound breaking up into its constituents in the organism. (Sudd. Ap. Ztg.)

ALLOY FOR SOLDERING GLASS.—An alloy that adheres firmly to glass, and may be used for soldering glass to metal, or glass to glass, is prepared by fusing together 95 parts of tin and 5 parts of zinc. The melting point of the mixture is about 205° C. The glass is heated to this temperature, the solder is applied and the glass allowed to cool slowly. An alloy of 9 parts of tin and 1 part of aluminum may be used for the same purpose, but its high fusing point, 300° C., is rather a disadvantage. (Sudd. Ap. Ztg.)

TRIPHENIN (propionyl-phenetidin) is prepared by boiling a mixture of para-phenetidin and propionic acid. It forms a white, odorless, shining, crystalline powder of feebly bitter taste, and melting at 120° C. It dissolves in about 2,000 parts of water, is therefore considerably less soluble than the other similar remedies (lactophenin, phenacetin and acetanilid). The single dose of triphenin is 0.5 to 1.0 gm. (8 to 15 grains), best given in waters. The daily dose should not exceed 3.0 gm. (45 grains). According to Gaude (D. Med. Ztg.), it is a reliable antipyretic, a sure and rapid anti-neuralgic, and an excellent nerveine. It also frequently acts as a hypnotic. (Ph. Ztg.)

TREATMENT FOR RHEUMATISM WITH SALOPHEN.—Dr. Mosler proposes for acute articular rheumatism a combined treatment with salicylic acid and salophen, in such a manner that the cure is begun by giving large doses of salicylic acid for 3 to 5 days, and continued with daily doses of 2 to 3 gm. (30 to 45 grains) of salophen, which is better borne by the stomach and nervous system, since it is free from any secondary effects on these organs. Salophen is also free from odor and taste. (Ap. Ztg.)

YELLOW SALVE.—F. Shanz (Centralbl. für prakt. Augen) recommends the following formula instead of the usual form of yellow oxide of mercury ointment used in ophthalmic practice:

Yellow oxide of mercury..... 0.1 or 0.2 grams
Lanoline.....
Distilled water, of each..... 1.0 gram
White vaseline, enough to make..... 10.0 grams

The author claims that the salve mixes well with the conjunctival secretion, does not become rancid, can be kept from degenerating by being placed in an opaque vessel, and holds the medicament in very fine subdivision.

SOLUTION OF ALUMINUM ACETATE.—In view of the increasing demands for this solution as a non-toxic surgical dressing, etc., and the lack of stability of the ordinary preparation, Athenstaedt (Ap. Ztg.) proposes that it should be prepared extemporaneously when wanted, from solutions to be kept in stock. These solutions contain basic sulphate of aluminum and calcium acetate, respectively, in such proportions that a solution meeting pharmacopoeial requirements is obtained by mixing equal parts of the stock solutions. Aluminum acetate is formed, which remains in solution, and calcium sulphate, which is precipitated in form of a loose crystalline powder, and can be readily separated after a short time by expression. The advantages claimed for this procedure are: (1) that a relatively stable solution is obtained; (2) that any quantity of a faultless solution may be prepared extemporaneously in the simplest manner; (3) that the quantity of precipitate to be removed is less than in the customary methods; (4) that the solution so prepared is cheaper.

LIQ. STRONTHI ARSENITIS AQUOSUS.—Solomon (Amer. Pract. & News) gives the following working formula for the production of an aqueous solution of strontium arsenite, one per cent.:

Potassium bicarbonate 20 grains
Strontium arsenite 4.8 grains
Alcohol ½ dram
Compound spirit of orange 2 drops
Syrup 1 dram
Distilled water, enough to make..... 1 ounce

Triturate the strontium arsenite with ten grains of potassium bicarbonate; transfer to a small porcelain capsule, and add two drams of distilled water. Apply heat up to the boiling point; decant the clear solution and add a small quantity of the remainder of the potassium bicarbonate and one dram of water to the residue, boiling again and then decanting the clear solution. Continue to boil the residue as before, each time with a small quantity of the potassium bicarbonate and about one dram of water, or less, until the entire residue is dissolved. The compound spirit of orange is dissolved in one-half dram of alcohol, and the syrup added. The solution is now filtered, and sufficient water added to bring the total quantity up to one ounce. The author recommends the above as a decided improvement over Fowler's solution.

DETECTION OF GELATIN, DEXTRIN AND ACACIA IN DRIED EGG ALBUMEN.—Ten gm. of the powdered albumen are stirred with warm water and the mixture then brought to the boiling point. After a few minutes the albumen is coagulated completely, as shown by non-precipitation of the liquid on addition of diluted nitric acid, and the precipitate is removed by filtration. A small quantity of the filtrate is put aside during 24 hours in a cool place. In presence of 2 per cent. or more of gelatin it will gelatinize. If on cautious addition of 90 per cent. alcohol to another portion of the filtrate a decided tur-

bidity is produced, which disappears on shaking, but on further addition of alcohol is again formed, and does not disappear on shaking, the presence of either gelatin, dextrin or gum arabic is indicated. The turbidity caused by gelatin is removed by adding a little nitric acid; that caused by dextrin or acacia is not. Pure albumen gives with alcohol only a slight turbidity, which disappears on the addition of nitric acid. Dextrin is recognized in the filtrate by a red coloration with iodine test solution, and by reduction of Fehling's solution. Gum arabic gives a precipitate with subacetate of lead solution; on the addition of ammonia, dextrin also. (Chem. Centralbl.)

STERILIZATION IN DISPENSING.—P. v. d. Wielen (Tüdschr. v. Pharm.) makes the following observations regarding the sterilization of medicines in the dispensing room: Under no circumstances is the pharmacist permitted to add antiseptics or bactericides to medicaments prescribed by physicians, without orders to that effect, whether they be toxic, as corrosive sublimate, phenol, salicylic acid, or innocuous, as boric acid, thymol, camphor, benzaldehyde, cinnamic aldehyde, styrol, etc. To dispense prescriptions in sterile condition, the following definite rules are given: (1) In sterilizing the fact must be kept in view that all kinds of bacteria may be present. Carriers of bacteria are the dust of the atmosphere (bacillus septic, Pasteur, the tetanus-bacillus, bacillus anthracis, streptococcus septic), the packing straw of bottles (bacillus subtilis, which just bears the heat of boiling water, while the anthrax bacillus bears a boiling heat for several minutes), the water, the hands, etc., for which reason sterilized substances must not be touched. (2) In dry sterilization the temperature must be much higher than in the wet method, namely 130° to 150° C. It is advisable to place asbestos in the bottom of the oven, to prevent overheating by contact with metal. (3) Fire-proof utensils (spatulas, pincers, etc.) are held in a non-luminous flame and then into boiling water. In this way they are cooled to 100° C. and dried at the same time; they are used without wiping them off. (4) Bottles, funnels, mortars, ointment jars, glass plates, etc., are best sterilized by boiling one hour in distilled water. (5) Filter paper, cotton and pieces of paper for weighing are heated at least an hour at 120° to 130° C. in the drying oven. In sterile filtrations the filter is not previously moistened, and it must fit completely into the funnel. (6) The bottles are closed with sterile cotton, or with rubber stoppers that have been immersed in boiling water for one hour, or with faultless corks that have been immersed for one hour in a 0.2 per cent. solution of corrosive sublimate, and then washed for a few moments in boiling distilled water, the method of stoppering depending on circumstances. The stoppers are taken with pincers out of the boiling water and placed lightly into the necks of the filled bottles, when their temperature is highest. On cooling the stoppers are drawn deeper by the partial vacuum formed within, and are covered over with melted paraffin. (Ap. Ztg.)

The Troubles of Great Men.

There are writers of advertising who bravely and enthusiastically dip pen in ink when their task confronts them. Often they find the liquid dry upon the pen before they can write down the clever headline or even get the first word. Such unfortunates may find some comfort but little aid in the following item, which is going the rounds of the press:

"Those who write are often troubled how to begin. Gibbon for a very long time was unable to decide how to begin his famous history and Tasso worried over five subjects before he finally chose one for his ode. When Gray was trying to write his installation ode he went nearly crazy thinking of the first line. Finally a friend who came to call was met at the door by the poet, who greeted him with frenzied eye in these words: 'Hence, avast! 'Tis holy ground.' It seems these were the words of the first line which had puzzled Gray so long.

"Anthony Trollope went through days of agonizing doubt before he could begin a novel. Hall Caine has the same experience, except that he has it with each chapter. Frank Stockton says he has at times waited an hour for the right word."

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Queries from Non-Subscribers Not Answered.

John C. Wilson, Chicago, Ill., should read the rules at the head of this department. The question box is reserved for subscribers and their clerks.

Manufacturers of Blue Print and Black Process Paper.

(C. F.) Keuffel and Esser Co., No. 127 Fulton street, this city, manufacture blue print and black process papers used by printers.

Antipyretic Powder.

(C. C.) Various analyses have shown the presence of acetanilide, sodium bicarbonate and caffeine in the proprietary antipyretic and analgesic powder you name. We cannot give the formula.

Removing Odor of Vapo Cresoleum.

(H. D. F. S.) We know of no practical method for removing the odor left in a room after burning vapo-cresoleum. However, it is probable that the free circulation of air through the room will "wear it out" about as quickly as anything. The burning of scented fumigating mixtures may partially mask the odor, but it will not remove it. A fresh coat of paint or whitewash and new wall paper may also help matters.

Sizing for Painting on Silk.

(W. M. B.) Apply to the parts to be painted a sizing made with gum arabic or isinglass. Some artists recommend for the same purpose a sizing made from the white of eggs.

To fix crayon painting on silk: Spray upon the design with an atomizer a volatile copal varnish like the following: fine copal broken small, 12 parts; ether 2 parts; alcohol 12 parts; oil of turpentine, best quality, 5 to 9 parts. A simple varnish which may be applied with pencil is: Mastic, 3 ounces, dissolved in 1 pint of alcohol.

Correction of a Correction.

In this journal, August 18, 1898, page 218, we attempted to make a correction of an error occurring in the Era Dose Book under the caption "Equivalents of Metric Weights" (page 45), where the statement is made that "10 pounds (avoirdupois) = 5435.92 grams." It should read, "10 pounds (avoirdupois) = 4535.92 grams," and so we stated in the issue of the Era referred to. The compositor, however, made us say "grains" instead of "grams," an error which was not caught by the proofreader.

"Smoky" Insect Powder.

(Subscriber X.) Besides punk, eucalyptus and common mallow leaves slightly dampened have been suggested to be burnt with insect powder to produce a greater volume of smoke. A little experimenting will probably reveal a number of other substances which will answer equally well. A formula for fumigating pastilles containing insect powder and said to produce a considerable amount of smoke when burned, follows:

Charcoal	.....	1	pound
Salt peter	.....	2	ounces
Carbolic acid	.....	1 1/2	ounces
Persian insect powder	.....	8	ounces
Mucilage of tragacanth, q. s.	.....		

Form into pastilles.

Codine Sulphate in a Prescription.

(C. & W.) ask how they may make a cough mixture from the following formula, which will not precipitate:

Codine sulphate	.....	4	grains
Syrup tolu	.....		
Syrup wild cherry, of each	.....	1	ounce

If the syrups are prepared according to the pharmacopoeial formulas and care be taken to thoroughly dissolve the codine sulphate, there should be no precipitation. Codine sulphate is completely soluble in the syrups, though it may be rubbed up with a little water to hasten solution and then mixed with the syrups. The addition of a little more glycerine to the syrup of wild cherry before mixing it with the syrup of tolu, tends to preserve the transparency of the finished product.

Carbonates and Fermented Mucilage.

(J. B.) submits the following prescription:

Bismuth subcarbonate	.....	6	drams
Sodium bicarbonate, of each	.....	1	dram
Cerium oxalate	.....	4	ounces
Mucilage of acacia	.....		

He says the mixture exploded in about half an hour after it was put up, and he wants to know what caused the trouble.

The explosion was undoubtedly due to the liberation of carbonic acid gas from the carbonates by sour or fermented mucilage. Mucilage of acacia should be freshly made when wanted for use. Unless this be done, mucilage is sure to contain some free (acetic) acid (produced by fermentation), especially after standing but a very few days.

Removing Ink Stains from Paper.

(J. A. P.) A number of formulas were published in this journal March 31, 1898, page 477. The application of a cold aqueous or acetic acid solution of calcium hypochlorite or bleaching powder is about as satisfactory as anything for removing stains made by most inks. For the removal of stains made by iron inks, a solution of oxalic acid may be used, or, better, thick blotting paper may be soaked in a concentrated solution of the acid and dried. Laid immediately upon a blot or stain it takes it out without leaving a trace behind. If the color is produced by aniline red, try a solution of 7 parts sodium nitrate and 15 parts dilute sulphuric acid in 500 parts water, applying to the spot or writing to be erased with a camel's hair brush, and rinsing carefully with water.

Silvering Mirrors.

(L. R. E.) See this journal, August 19, 1897, page 240. Here is another formula: Dissolve 15 grains of silver nitrate in 5 drams of water, and add stronger water of ammonia until the precipitate at first formed is redissolved. Then add 15 grains of caustic potash dissolved in 1 dram of water; a precipitate is again formed, and ammonia solution is to be added until it almost dissolves. Then add a saturated solution of silver nitrate until the solution becomes of a straw-color. Now place the glass to be silvered in a flat dish (such as a developing dish), with supports which will raise it about 1/2-inch from the bottom. Pour water into the dish to completely cover the under surface of the glass; remove the glass, pour some of the silver solution into the water, stir; then add some solution of pure dextrin, again stir, and replace the glass. A deposit of metallic silver is formed on the surface of the glass in about fifteen minutes.

Works on Pharmaceutical Jurisprudence.

(J. L. F.) Beyond what has appeared in various drug journals throughout the country, there have been published no comprehensive works on the subject of pharmaceutical jurisprudence. The reason for this is probably the fact that the legal duties and liabilities of the pharmacist are generally determined upon general broad principles, for, unlike the physician, the druggist is not looked upon as having a peculiar law of his own. However, considerable information upon this subject may be obtained from a perusal of Fall's "The Law of the Apothecary," a compendium of both the common and statutory law governing druggists in various States. Then, too, some interesting points may be gleaned from

Hamilton's "System of Legal Medicine" and other works on medical jurisprudence, though this information is rather more general than specific. You will also do well to consult a file of the annual proceedings of the American Pharmaceutical Association. Fall's "Law of the Apothecary" is published in Boston, Mass., by Irving P. Fox.

Effervescent Lithium Tablets.

(G. W. M.) In addition to the formula given in this journal, August 23, 1898, page 252, we submit the following from Edel's "How to Make Tablets":

Effervescent tablets can be made in two ways. Either the compound can be made as an effervescent salt and granulated with alcohol, then when dry compressed or, the parts may be granulated separately as in the formula below and well dried, then mixed thoroughly and compressed.

(1) Citric acid	480 grains
Lithium carbonate	106 grains
Sodium bicarbonate	304 grains
Powdered sugar	276 grains

Powder the citric acid and dry thoroughly, then mix with 76 grains sugar and moisten with water and pass through sieve and dry thoroughly. Mix the sodium bicarbonate and lithium carbonate and balance of the sugar and granulate and dry. Then mix the two granulations and make 100 tablets, or the tablets can be made as follows:

(2) Lithium citrate	300 grains
Sodium bicarbonate	300 grains
Tartaric acid	275 grains
Sugar	275 grains

Dry separately and mix thoroughly and moisten with alcohol, rub through a No. 20 sieve, dry thoroughly and make 100 tablets.

Hastening Fermentation of Cider.

(L. P. K.) Fermentation may be materially hastened by enlarging the surface of the cider exposed to the air, and preserving the proper temperature to facilitate the fermentation. The success of the so-called "quick method" depends almost entirely upon the free circulation of air throughout the generator. In practice this is accomplished by causing cider or other fermenting liquid to become oxidized by trickling down over beechwood shavings, corn cobs, etc., thereby exposing it to the action of the air and rapidly hastening fermentation. The Cyclopedica of Receipts gives the following method for a quick process for making vinegar from any dilute alcoholic liquor: In this process dilute alcohol liquor to which one thousandth part of honey or extract of malt has been added is caused to trickle down through a mass of beechwood shavings previously steeped in vinegar and contained in a vessel called a vinegar generator (essigbiller). It may consist of a large oak hogshead or barrel furnished with a loose lid or cover, a few inches below which is fitted a perforated shelf, having a number of small holes loosely filled with packthread about six inches long, knotted at the upper end to prevent their falling through. Several small glass tubes, long enough to project slightly above and below the shelf, are also fitted in perforations in the shelf to serve as air vents. The vessel at the lower part is pierced with 8 or 10 holes equally distributed around the sides at about 6 inches above the bottom, to admit of the entrance of air. A small siphon tube, the upper curve of which is an inch below the air holes, serves to carry off the liquid as fast as it accumulates at the bottom. The alcoholic liquid, at a temperature of 75° to 83° F., is run in on the shelf, and slowly trickles down through the holes by means of the packthread, diffuses itself over the shavings, slowly collects at the bottom, and runs off by the siphon exit. The air enters by the lower holes, passes freely through the shavings, and escapes by the glass tubes. The temperature within the apparatus soon rises to about 100° F., and remains stationary at this point, while the action goes on favorably. The liquid generally requires to be passed three or four times through the cask before its acidification is complete.

Application for Pimples.

(M. P. Co.) Several formulas appeared in this journal March 26, 1898, page 332. Here are some others:

(1) Carbolic acid	15 drops
Borax	60 grains
Glycerin	4 fl. drams
Tannin	30 grains
Alcohol	1 fl. ounce
Rose water	2½ fl. ounces
Mix and dissolve. Apply night and morning.	
(2) Camphor	0.5 grams
Salicylic acid	0.5 grams
Soap (medicinal)	1.0 grams
Zinc oxide	2.0 grams
Sulphur, precipitated	10.0 grams
White oil	12.0 grams

Apply to the affected parts on going to bed and wash off in the morning.

(3) Ointment benaphthol	15 grains
Ointment storax	15 grains
Lard, benzoated	375 grains

Application of this mixture should be made with strong friction every night for a week, then interrupted for six days, when it may be repeated if necessary, although it is often useless to do so. If there is an appearance of small acute clusters, which generally show themselves toward the second day, the acne is ordinarily cured or very much ameliorated at the end of a week.

(4) Crystallized alum	1 ounce
Salt	1 ounce
Sublimed sulphur	1 ounce
Sugar candy	2 drams
Spermaceal	2 drams
Ether flower water	3 ounces
Distilled water	3 ounces
Brandy	10 ounces

Reduce all the solids to fine powder and rub up with the mixed liquids. The lotion to be applied at intervals during the day upon linen rags, which should frequently be changed. It is said this lotion is an effectual and quick remedy for eruptions on the face.

Preservation of Leeches.

(S. & A.) Some years ago a writer in the Pharm. Ztg. who had previously had considerable difficulty in keeping leeches without incurring considerable loss, recommended the following method as being excellent: A thin layer of coarse, washed sand is strewn on the bottom of the container, together with some clean, washed straw. This requires renewal every six months, and, according to the season, the water—one liter to ten leeches—must more or less frequently be replaced, thoroughly cleaning the jar each time. Treated in this manner, the leeches retain their vitality almost indefinitely, and the loss is very exceptional.

Many methods for keeping and preserving leeches have been proposed, few of them, perhaps, being absolutely successful. Most of them, however, agree upon the following points: They should be kept in clean river water in a glass jar covered with a linen cloth, and put in a shady place which is free from ammoniacal and other noxious vapors. The temperature is best kept between 10° and 20° C. (50° and 68° F.), sudden changes being carefully prevented. As soon as the water begins to get turbid or colored, the leeches should be placed in clean water of the same temperature, and the jar well cleaned from the slimy deposit, which is caused by the transparent epidermis being thrown off every four or five days. To facilitate this removal, some material is often put into the jar through which the leech may draw itself, and which, by retaining this slime, will tend to keep the water clean; charcoal, pebbles, clay free from lime, moss and Irish moss have been recommended and found advantageous for the purpose, and apparatuses have been constructed in which leeches may be kept on a bed of material which permits of a frequent renewal of the water without handling the leeches. If they are kept in moist earth, turf or clay, this should be examined from time to time and dead animals removed. The water should be changed at least once a week, and oftener in warm weather. It will be observed that the conditions for the preservation of leeches are pure air, pure water and a pretty uniform temperature. Leeches are subject to several diseases which may become epidemic, and which are recognized by an excessive separation of mucus, ulcerations, tumors or a flaccid appearance of the body; those thus attacked should be at

once removed from the healthy ones, and placed in a separate vessel in clean water upon a layer of washed charcoal.

Tasteless Syrup of Quinine.

(D. Bros.) We cannot give the formula for the proprietary article. Amorphous quinine" as used in some febrifuges upon the market, has been reported to be simply alkaloidal quinine in crystals, reduced to a fine powder, and then triturated with the desired vehicle. "Amorphous quinine," it is argued, makes a paste with syrup, therefore it is not used in preparations of the above character.

Here are some formulas for "tasteless syrup of quinine from Griffiths' 'Non-Secret Formulas'."

(1) Saccharine	1 dram
Water	4 ounces
Sodium bicarbonate	2 drams
Quinine (alkaloid) 4 ounces av.	
and	208 grains
Oil lemon	$\frac{1}{2}$ dram
Potassium carbonate	$\frac{1}{2}$ dram
Simple syrup, enough to make	128 ounces

Mix the saccharine and water, add the sodium bicarbonate, and dissolve. Rub the oil of lemon and potassium bicarbonate together in water, add the saccharine solution gradually with constant stirring. Put the quinine alkaloid into a glass bottle, pour on the other ingredients and shake well.

(2) Quinine sulphate	128 grains
Potassium carbonate	110 grains
Saccharin	40 grains
Solution potassium arsenite	2 fl. drams
Soluble essence of lemon	4 fl. drams
Water	1 fl. ounce
Syrup, enough to make	16 fl. ounces
(3) Quinine sulphate	64 grains
Cinchona sulphate	64 grains
Sodium bicarbonate	120 grains
Saccharin	15 grains
Oil wintergreen	30 minims
Fowler's solution	256 minims
Alcohol	2 ounces
Water	3 ounces
Cascara cordial, enough to make	16 fl. ounces

Dissolve the cinchona salts and oil of wintergreen in the alcohol, using a gentle heat of the water bath. Dissolve the saccharin and sodium bicarbonate in the water. Mix the solution of cinchona salts with the cascara cordial and then add the solution of saccharin and sodium bicarbonate; lastly add the Fowler's solution and mix well.

Analysis of Phosphates.

(G. F. R.) Phosphates are as a rule insoluble in water, except the alkaline ones. They are readily soluble in dilute acids, and entirely reprecipitated on neutralizing by an alkali or an alkaline carbonate. Calcium, strontium, and barium phosphates are only partly soluble in dilute sulphuric acid, being converted into a soluble phosphate and an insoluble sulphate of the metal. If the insoluble sulphate be filtered out, the addition of an alkali causes only a slight precipitate of a dimetallal phosphate, and a phosphate of the alkali used is left in solution; but it is only after the use of sulphuric acid that any phosphate thus remains in solution.

In qualitative analysis phosphates are detected (1) by precipitation with ammonium molybdate in nitric acid solution, the resulting product being the pale-yellow colored ammonium phosphomolybdate. This test is said to be most distinctive. (2) With barium or calcium chloride white precipitates are produced, soluble in acetic acid (distinction from oxalates) and all stronger acids. (3) With ferric chloride in the presence of ammonium acetate a white precipitate of ferric phosphate appears, insoluble in acetic acid. (This reaction is made the means of separating phosphoric acid from metals of the earths and alkaline earths.) (4) With magnesia mixture phosphates yield a white crystalline precipitate, forming slowly in dilute solutions, consisting of ammonium-magnesium phosphate, $(Mg(NH_4)PO_4 \cdot 6H_2O)$, soluble in acetic and all acids. Other confirmatory tests are the well-known reactions with the nitrates of silver, uranium, mercury (mercurous), and bismuth (bismuthous). Soluble salts of lead produce a white precipitate of lead phosphate, soluble in nitric acid, but insoluble in acetic acid or ammonium hydrate. In the analysis of a compound containing phosphoric acid it is supposed that you have already determined the presence or absence of certain bases by the usual group reagents, schemes for

which may be found in almost any work on qualitative analysis.

Quantitatively phosphates may be estimated in the dry way by one of several methods, viz.: as magnesium pyrophosphate in alkaline phosphates; as magnesium pyrophosphate in the presence of calcium and magnesium (this process is suitable for determining the "soluble phosphates" in an artificial manure); as magnesium pyrophosphate in the presence of iron and aluminum, and estimation as phosphomolybdate. This latter process is said to be best for determining small amounts of total phosphates in cast iron, waters, and soils. In the wet way phosphoric acid may be estimated by means of a standard solution of uranic nitrate in the presence of sodium acetate. Full details of this process may be found in Sutton's Volumetric Analysis.

The following books on qualitative and quantitative analysis are recommended: Prescott and Johnson's Qualitative Analysis, \$3.50; Trimble's Practical and Analytical Chemistry, \$1.50; Muter's Analytical Chemistry, (qualitative and quantitative), \$1.25; Curtman's Lessons in Analysis, \$1.25; Hoffman and Power's Manual of Chemical Analysis, \$4.25; Sutton's Volumetric Analysis, \$4.50. Other works on general and analytical chemistry may be found listed in the Prospectus of the Era Course in Pharmacy.

Faraday's Law.

(W. D.) "Faraday's Law," otherwise known as the fundamental law of electrolysis, is thus stated and discussed by Newth (Inorganic Chemistry, London, 1894): When the same quantity of electricity is passed through different electrolytes, the ratio between the quantities of the liberated products of the electrolysis, is the same as that between their chemical equivalents.

Thus, if the two electrolytes, hydrochloric acid and dilute sulphuric acid, be introduced into the same electric circuit, hydrogen and chlorine are evolved in the one case, and hydrogen and oxygen in the other. If the gases be all collected in separate measuring vessels, it will be seen (1) that the hydrogen and chlorine evolved from the hydrochloric acid are equal in volume; (2) that the volume of hydrogen collected from the other electrolyte is the same, while that of the oxygen is equal to only one-half this amount. Knowing the relative weights of equal volumes of these three gases to be hydrogen, oxygen, chlorine, as 1, 16, 35.5, we see that they must have been liberated in the proportions by weight of:

Hydrogen = 1 Oxygen = 8 Chlorine = 35.5.

Similarly, if the same quantity of electricity be passed through aqueous solutions of hydrochloric acid (HCl), silver nitrate ($AgNO_3$), copper sulphate ($CuSO_4$), and gold chloride ($AuCl_3$), by the time that 1 gramme of hydrogen has been liberated from the hydrochloric acid, there will be deposited upon the cathodes of the other electrolytic cells, 108 grammes of silver, 31.7 grammes of copper, and 65.6 grammes of gold. These numbers, which are the electro-chemical equivalents are identical with the chemical equivalents of those elements, the chemical equivalent of an element being its atomic weight divided by its valency.

Atomic weights.	H.	O.	Cl.	Ag.	Cu.	Au.
	1	16	35.5	108	63.5	197
Valency	1	2	1	1	2	3

Regarding the quantity of electricity required to liberate 1 gramme of hydrogen as the unit, we may say that 16 grammes of oxygen require 2 units of electricity for its liberation, 108 grammes of silver 1 unit, 63.5 grammes of copper 2 units, and 197 grammes of gold 3 units; or, in other words, the number of units of electricity required to liberate a gramme-atom, is identical with the number representing the valency of that atom in the particular electrolyte employed.

Some metals, such as copper, mercury, tin, etc., are capable of functioning with different degrees of valency. Thus copper is divalent in copper sulphate and in cupric chloride, but monovalent in cuprous chloride. If, therefore, 1 unit of electricity be passed through aqueous solutions of each of these copper chlorides, in the case of cupric chloride $\frac{63.5}{2} = 31.7$ grammes of copper will be deposited, while in the cuprous chloride $\frac{63.5}{1} = 63.5$ grammes are formed.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission.

Vol. XX.

NEW YORK, OCTOBER 13, 1898.

No. 15.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York.
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL 477	Rebate Plan 498
CORRESPONDENCE 480	Chicago Jobbers Not Wor-
Ehring's Reply 480	ried; No Effect on Trade
ERA COURSE IN PHAR-	Here 499
MACY 481	Boston Men Going to Con-
Inorganic Chemistry 481	vention; Retailers' Con-
Pharmaceutical Physics 482	vention 499
Official Preparations 485	Commissioner Appeals to
Pharmaceutical Latin 485	Attorney-General; Inter-
The Apothecaries' Garden 489	national Revenues for August 500
Crude Caustic Soda Sold	Look Out for Stein &
in the Market as Caustic	Co.; Russell's Murderer
Potash 491	Tracked; Tricks of Drug-
PHARMACY 492	gists' League 501
QUESTION BOX 494	Schiffelin & Co.'s Bad
NEWS AND TRADE DE-	Spaniard; Counter Pre-
PARTMENT 497	scribing; Explosions 502
Is the Rebate System in	NEWS LETTERS 502
Danger; Mr. Kline Sees	BUSINESS RECORD 506
No Danger; Opinions of	Associations, Boards, Col-
New York Trade 497	leges 507
Boston Jobbers' Views;	STATE OF TRADE 509
Mr. Davis Believes in	MARKET REPORTS 510

A COMPLETE TRADE LIST.

A complete list of persons and firms engaged in the drug business is almost indispensable to all those who supply any of the goods handled in drug stores. Such a list is of great convenience and importance in sending out samples, or circulars, catalogues, etc., and in conducting correspondence with the trade. The Era Drug-gists Directory furnishes such a list, the Sixth Edition—1898, contains the names of 307 jobbers located in the United States and Canada; 37,540 retailers located in both countries and of 5,398 manufacturers located in the United States. The arrangement is alphabetical by States and towns and street addresses are given in cities. Changes in firms or their location are published each week in the Era under the head of "Business Record," so that the possessor of a copy of the directory is furnished with the means for keeping his trade list revised and up to date. The price of the directory is \$5.00 per copy, delivered.

Address The Pharmaceutical Era, Box 1483, New York.

Wipe It Out.

During the past three months the drug trade have been getting a lot of experience. The enforcement of that portion of the new war revenue bill contained in Schedule B, and which refers to the stamping of proprietary medicines, has had a fair trial, and has been the cause of endless dissatisfaction and complaints, has disturbed business relations, cut down profits and caused havoc generally in the drug trade. In the first place, it is radically unjust legislation. There is not one grain of sense in taxing proprietary medicines and letting other proprietary goods go free of such taxation. The maker of shoe polish, or soap, or canned goods, is just as able to pay his tax as is the manufacturer of proprietary medicines. If a revenue is to be raised by taxing proprietary goods it should include them all. Further than this, the rate of taxation demanded is too high. Two and a half per cent. on the retail price is equivalent to from 4 to 5 per cent. on the manufacturer's selling price, and it takes a pretty healthy business to carry such an additional expense. If the tax was reduced to, say 1 per cent., and the stamps issued on the decimal system, so as to apply to everything that sells from 5 cents to \$1 or upwards, the manufacturers would probably stand this themselves, without trying to throw it on to the jobbers and the retailers.

But why should these proprietary goods be stamped? Our legislators have not put forth one good sensible reason why proprietary medicines should be singled out for this revenue. They say they don't want to tax foods because it hits the poor man. Well, who buys most of the medicines? Is it the poor or the rich? Of course, we all know it is the poor people, and when a poor man needs medicine for his family it is the worst time to strike him for an additional expense. The idea was taken from our old revenue tax of '61, when conditions were radically different, when the patent medicine business was much more profitable than it is to-day, and when there was nothing like the variety of medicinal preparations that there are to be found in the present market.

Next week the drug trade is to hold its annual meetings in the city of St. Louis. There is every indication that the attendance will be large and all branches of the trade will be well represented. This revenue tax will be the important issue of these meetings, and why not make a united effort to have this feature of that law wiped off the statutes? It is unjust; it is class legislation; the Government don't need the revenue; it is an imposition upon one branch of trade; it is a nuisance and the law should be repealed.

If the leading spirits in these several organizations which are to meet in St. Louis will unite upon plans for an active campaign to have this law wiped out of existence, there is good reason to expect that Congress will take such action at its next session in December. The effort, however, to be successful must be a national one, and every possible branch of the trade must unite in a determination to influence

the legislators in their respective districts, by calling upon each one and explaining to him why medicines and the drug trade should not be singled out for this burden.

The Quest for the Owner of the Prescription.

A study of recently published consular reports relative to the drug trade in foreign countries shows an apparent preponderance of the belief that the original prescription, regarded as a document, belongs to the patient for whom it is written. The duties, rights and privileges of the pharmacist, as concerns the document, are confined to the requirement that he make a literal copy and preserve the copy as a record and safeguard. In some countries this copy is regarded as "official" and conclusive evidence of the transaction. Where such a practice exists there are usually quite minute and detailed regulations governing both the writing and filling of prescriptions. There are definite rules bearing upon maximum doses and a certain procedure for insuring a thorough understanding in case the maximum dose is exceeded, as well as directions for dispensing poisons and the correction of errors in prescriptions.

In English-speaking countries these matters are not so much under legal restriction. Custom or the teachings of the schools seem to govern, and much is left to the discretion of physician and pharmacist. They are advised more of what they should do, rather than of what they must do. This species of freedom, with the knowledge that every man must protect himself from possible ill consequences in writing and filling prescriptions, has undoubtedly given rise to the feeling on the part of the pharmacist that he should be the final custodian of the original prescription, even should he admit that the equities of the situation vest the ownership in the patient. The original is regarded as a safeguard or voucher in case of dispute as to errors in dosage or dispensing, and as the prescription is a direct command to do certain things in accordance with his particular art, and the pharmacist is the last man to handle the prescription and usually the first to be investigated, he naturally desires to have the evidence in his own possession. Besides, he knows that ever since the composition of the Scriptures, copying has given rise to errors. Transcription undoubtedly serves to fix the minute details of a prescription in the mind, but if error is made in copying, the error is just as firmly fixed.

The danger of copying is nowhere more fully recognized than upon railroads, where the movement of trains is regulated by telegraphic orders. Such orders are telegraphed to trains and then telegraphed back, word for word, to the office where they originate, so that there may be no error. There are rigid rules against making copies of orders except such as are made through carbon sheets at the first writing. Where copies are strictly necessary, they must be telegraphed back to the original sender the same as an original. This practice of the railroad is necessary because of the obvious danger to life which would result from error in copying a document which is much like some prescriptions in its relation to life and health.

If any legislation or the establishment of additional customs is necessary to safeguard dispensing upon prescription, the physician might be required to follow the method of the railroad telegraph operator, who is required to "copy 3," that is, make three copies or more at one writing as the telegraph instrument dictates the words, keeping one copy for himself and furnishing one to both conductor and engine-man. In the case of the prescription, each

party concerned, physician, patient and pharmacist, would be in possession of a practically original prescription, and no question need arise as to ownership. Where it is undesirable for the patient to retain a copy of the prescription, the physician could omit giving the copy for the use of the patient.

This "three-copy" procedure would be, of course, only necessary in localities where the ownership of the prescription is a disturbing factor, but its suggestion anticipates a time when the matter will come up for legal consideration and be settled in favor of one party and to the possible disadvantage of the other two. It need never come up for adjudication under an established and obligatory three-copy system. The medical profession might dislike the bother, but as things are now there is quite a little bother as to who owns the prescription.

The Discounter.

"The discounter is the money maker," says Charles Biggs, in *Business Topics*. This comes so near being an axiom that nearly every druggist might use it as a sort of reagent for detecting profit in his business. As a rule, the fact that a merchant takes advantage of ten or thirty-day discounts is quite good evidence that he is conducting a profitable business. It shows a pardonable desire to make money along legitimate lines; indicates that the returns from a business are not improperly diverted by extravagance in living or mistakes in business; shows that the discounter has an income not enjoyed by the non-discounter.

In years past farmers established a social prestige by having money on interest. The discounter of to-day gains prestige by discounting his bills. He is an important personage with manufacturer and jobber. He really has a credit which he doesn't need, and, strange as it may seem, the people who are vitally interested in having him retain this credit inadvertently try hardest to destroy it by tempting him to buy beyond his needs and his ability to pay within the discount time limits. It is virtually a case of killing the goose that lays the golden eggs. The fortunate discounter needs to vigilantly guard against losing this "profit in advance" this sure income. One or two per cent. on a month's invoices, whether they foot up one hundred or one thousand dollars, does much to alleviate the bother and worry of freight, box, cartage and other charges.

"Buying from hand to mouth" is an expression of the market which may indicate a little impatience and dissatisfaction on the part of manufacturer and jobber, and for such feeling, when it exists, the discounter is in a great measure responsible. But he is the man who keeps business "going." He helps others to take advantage of discounts and pay their current expenses. After all he is the most dearly beloved brother of the business family.

Credits in Undeveloped Foreign Countries.

One of the things often referred to as a trade barrier by our consuls to foreign countries is that part of our credit system which relates to time allowance. Our ten, thirty, sixty and ninety day offers are treated with a sort of patronizing derision, especially in those countries which are practically new and dependent upon the older ones for most of their supplies. Particularly is this the case in Asiatic and South American countries, where the six months' offer of the American trader is met by the European privilege of paying a year or longer after date.

The American practice of short credits is a matter which has been practically bred in the bone, and the progression from long to short is coincident with the growth and development of the country. In the days of the stage coach and canal boat the merchant

went to market and bought a large stock on long time. He had to have long time because his large stock went out slowly to a sparse population, possessing the crudest means of communication and transportation. To-day the maker and consumer are hardly thirty days apart, even if located at the extremes of the country. There is little necessity for long credits. Rapid transit has brought commodities within a day's journey, or less, of a majority of consumers, and exchanges are quickly made.

The foreign countries in which we seek a foothold in competition with long credits are, many of them, counterparts of our country in the twenties and thirties. Their "rapid" transit is of the stage coach and pack mule variety. Long credits are as necessary to them as they were to our merchants in the days of Andrew Jackson. We desire to pour into them material for rapid transit, railroad, telegraph and telephone supplies, but at this stage these things must be sold on long time. After we have sold enough and they have been properly utilized, credits will shorten through the same process which has shortened them in this country. But the short credit advantages are most likely to descend to the heirs and assigns of those who, in the early days of development, were willing to grant long credits.

The Secrets of the Tubercle Bacilli.

We are prepared to believe almost anything about anything. This state of mind is not the result of the transmission of hereditary characteristics, for our forefathers were stubborn doubters of the green cheese theory about the moon and were quite positive that America could not be discovered and that the telegraph wouldn't work. We are "heirs of all the ages," but our position in the foremost ranks of time makes us cautious. We strive to avoid brashness and the pointed finger of the "I-told-you-so." We have reason for caution; impossible things have happened in politics, also in science, and our anger is easily quenched at the reproach that we belong to the horse marines.

This frank confession of an obvious fact loosens our receptivity for the proper consideration of the report of researches of Messrs. de Schweinitz and Dorset, of the Biochemic Laboratory at Washington, published in the Journal of the American Chemical Society, relative to the "Mineral Constituents of the Tubercle Bacilli." These gentlemen have gone beyond our physiological astronomers, and, not content with merely gazing through a microscope at rods, spirals and dots, have captured a lot of the tubercle breed, and after the manner of the chemist have asked them what they are made of. The unfortunate bacilli were heated, filtered, washed, dried, powdered, extracted and again dried and ignited, and their ashes told tales of mineral constituents. As a result "the high percentage of phosphorus pentoxide can be attributed only to the fact that phosphorus, as well as calcium and magnesium, are absolutely necessary for the development of the tubercle bacillus, and were derived by it from those elements as normally present in the media. The high percentage of fat contained in the body of the tubercle bacilli, which we have noticed in previous papers, in conjunction with this high percentage of calcium and magnesium phosphate in the ash, give grounds for some interesting speculation. Phosphates and cod liver oil are two materials always strongly recommended in tuberculosis. As the germs of this disease seem to demand a large quantity of food containing phosphorus and also rich in fat, it is but a fair supposition that in giving the drugs above mentioned we are supplying to the animal body those constituents which are very

important for its proper nourishment, the supply of which is constantly being levied upon by germs of the disease. The question might be asked whether in this method of treatment we are not really feeding the bacilli rather than the individual. But just as an exhausted soil can be made valuable by the addition of constituents which are deficient, so we may assume that the administration of specific materials containing the elements that the germ has utilized, should act in a similar way in increasing the vitality of the animal body."

"Germ feeding" may be regarded with the characteristic levity of the day, but in seriousness the work and the results attained by these investigators are most promising, and having determined the fatty and mineral constituents of the tubercle bacilli, their further work in investigating albumenoid constituents, which is under way, is awaited with eager anticipation.

The Night Bell and Shorter Hours in Colombia.

American drug clerks who are disposed to look with disfavor upon the night bell may take comfort in learning that in Colombia "any party keeping a drug store is required to respond to the calls of the public for medicines at any hour, and if the call is made in the night time, or other time when the store is closed, to open the doors not later than ten minutes after having been summoned by a person desiring medicine."

The victim of "long hours" may also find comfort in this regulation: "Where there is more than one drug store, the owners or keepers may agree to keep open upon alternate nights. In such cases they shall notify the public through the newspapers or by posting placards in the most conspicuous parts of the town, and in the night time a colored light shall be exposed at the door of the store in case there is but one such store in the town, and if more than one, at the door of the one which the public has been notified will be open."

We Need a "Physicus."

The physicus is a useful functionary who pursues his calling in the Duchy of Brunswick. He is a skilled physician, appointed by the High Ducal Sanitary College to be health officer of each municipal judicial district. All apothecaries report to him the number of their clerks and apprentices, and he is present at the inspection of all drugs and apothecary stores, which usually takes place at intervals of three years. He conducts post-mortem examinations and gives expert evidence in court when his services are required. The unbiased medical expert as a part of our legal system is something that is needed in this country.

TESTING OF BITTER-ALMOND WATER.—To distinguish a water made from almonds or the genuine oil from a preparation made from benzaldehyde and hydrocyanic acid, Spasski recommends the following method: 20 Cc. of the water are mixed with 40 to 50 Cc. of hydrogen dioxide, evaporated to dryness after addition of 6 to 7 Gm. of caustic soda, and the residue fused. If the water has been made from the artificial oil, chlorine will be found in the fused residue. Benzaldehyde is made on the large scale from chlor-benzylidene, of which the purified product always contains small quantities. (Ap. Ztg.).

ONY-PHENYL-GUANIDINES are prepared by the reaction of a carbo-di-imide to an amido-phenol. They are expected to be used as anesthetics. Their chlorides are crystalline powders, soluble in water and in alcohol. From these solutions the free bases are precipitated by the addition of alkalis, in semi-liquid, oily form, becoming solid on standing. (Ztsch. f. Ph.).

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

THE RIGHT TIME TO HIT A HARD BLOW.

El Dorado, Ill., Oct. 1, 1898.

To all Retail Druggists:

In a very few days now we may all expect great offers from our friend C. I. Hood, in the way of calendars. Now is the time to make Mr. Hood realize the error of his way by refusing his calendar offer. If we expect to do anything, now is the time to do it. Let us all stand together in this, and refuse his offer. United we accomplish all, divided we accomplish nothing.

To All Proprietors of Patents Who Have Advanced Their Prices Since the War Tax Was Put On.

It makes no difference to us what you claim or say. We are in the fight to stay, until you reduce your prices, and we appeal to all our brother druggists to stand firm in this matter and discourage the sale of all patents that have been advanced. If you have any on your shelves take them down and put them under your counters to stay until the manufacturer realizes the hopelessness of his effort to take from us what is justly due us, and reduces his prices. We find it an easy matter to kill the sale of any patent medicine. Our customers are all willing to help us in the fight when we explain the situation. As you know, there is a feeling of contempt for all corporations. This makes it easy. Let them cry about substitution. When they do this we know they are hurt, and will soon be glad to accept our terms. We reduced the sale of advanced patents 75 per cent., and expect to the other 25 per cent. Let all our brother druggists do the same, and make them feel that our efforts are worthy their attention. Respectfully,

MITCHELL & SCUDAMORE.

ABOLITION OR MORE EQUITABLE DISTRIBUTION OF THE TAX.

Louisville, Ky., Sept. 30, 1898.

To the Editor. In your issue of Sept. 22 you invite suggestions as to the tax question, with request that no words be wasted denouncing anybody or thing. Such words would be wasted, but if ever a body or thing deserved denouncing it is the one who originated this present stamp tax. I served through the tax imposed in the 60s, compared with which the present tax is monstrous. If the tax is not needed for revenue (now that the war is over), let it be abolished entirely. If needed, let it apply alone and alike to all patent, secret, proprietary or trade-marked articles of every description, be they medicines, rat traps, foods, toys or water.

For, to single out medicine or drug men, whose merchandise alone shall be taxed to the exclusion of others, is contrary to the spirit of our Government, unpatriotic, wrong and unworthy of an intelligent people.

That medicines should be taxed at all is questionable. When needed, they are as essential as food or clothing. The whole thing seems based on the idea that druggists and patent medicine men enjoy enormous profits in their business, which is unfounded in fact, engendered in the public mind by newspaper jokes on "Eye Water," etc. Indeed, not now, nor ever were the profits excessive, compared with the volume of business done in other lines—hardware, shoes, clothing or groceries.

Grant that patent medicines are very profitable, for argument, should they be taxed, to the exclusion of trade-marked hats, pickles, etc., etc., etc. No fair-minded man will answer yes to such a question. If they are an evil, stop it; if a legitimate business, treat it as such.

The present tax on medicines is borne almost exclusively by the retail druggist, by reason of the fixed retail price, and the increased wholesale price, which the manufacturers, with a few honorable exceptions, have put upon their goods. It is creditable to the Department and the

Collectors all over the country, that they recognize the many absurdities of the tax, and I think we are sure to obtain relief at the next meeting of Congress. That three out of four men could be found who say that they "favor extending the tax to cover every known medicine" argues that they know nothing about justice or the form of Government under which they live. If this last violates your request, I beg pardon. I will be disappointed if the meeting at St. Louis does not result in an organization which will take care of their interests in the future. It can be done, and should be done.

As a friend of the retailer in the past, I hope you will lend your influence to correct this tax abuse, and encourage the retailer to organize for future defense and offense. Very truly yours,

ROBERT J. SNYDER.

PROFESSOR BEHRING'S REPLY.

The following, says Chemist and Druggist, is a literal translation of Professor Behring's reply to the criticism which has been passed upon him for permitting Messrs. Meister, Lucius & Brünig to obtain an American patent for diphtheria-antitoxin:

It is true that I have obtained a patent in America for my diphtheria-serum, and it is true that the American firms who have made use of my method are very angry about this. If the Americans interested in the matter give expression to their anger in American fashion, they must settle that with themselves; if they, however, quite contrary to their custom, declare the claiming of legal protection for a practical and important discovery or invention immoral and scandalous, I cannot take their judgment quite seriously. For my part, I do not consider a legitimate pecuniary gain dishonoring; I might almost go so far as to look on the giving up of a legitimate and considerable monetary profit as unpardonable thoughtlessness. We must wait and see whether the American courts will allow themselves to be intimidated by this newspaper persecution. If, as I confidently hope, this should not be the case, the American public will derive great benefit from the patent; they will obtain the antitoxin cheaper and better.

Finally, as regards the denial of my right of discovery, this can only rest on ignorance or dishonesty. Let each one of the investigators who took part in the discovery of the antitoxin be questioned. Not one of them will contest the priority of my discovery.

PEAT AS A PRESERVATIVE OF FOODS.—The property of peat, of preserving easily decaying substances, owing to its great capacity of absorbing water, and above all the power of destroying bacteria quickly and surely, is perhaps not generally known. W. Spring reports that meat packed in peat keeps fresh for a long time and finally dries out entirely without decaying, since the peat absorbs all water from it. Certain salt-water fish, which decay rapidly, have been transported in good condition from Copenhagen to Trieste, when packed in peat, during the Summer. Experiments with fruits of all kinds, including grapes, were also successful. Vegetables, potatoes, etc., when packed in the customary manner, always begin to sprout in the Spring, as the ordinary packing materials do not sufficiently protect them from warmth and moisture. Packing them in peat prevents sprouting entirely. It is also suitable for preserving eggs. The preserving effect of peat is due primarily to its power of killing bacteria. It has been found that it rapidly destroys cultures of the cholera bacillus. This is thought to be due to its great porosity, enabling it to occlude oxygen in its pores in the same manner as other porous substances, the oxygen being the factor in the destruction of the bacteria. Particularly good results were obtained in experiments with sterilized peat, that had been heated several hours at 100° to 120° C. (Sudd. A. Ztg.).

MANGANESE IN THE LIVING ORGANISM.—The presence of manganese in nature is quite general, as stated by various investigators. More recently P. Pichard has found relatively large quantities in the seeds of phanerogams, and in the tissues of rapidly growing cryptogams. Also in sea animals, in eggs, bones, in the flesh and hair of vertebrates, and finally in cow and horse dung manganese was found. The storing up of this metal in the most vital parts of the organism furnishes a strong confirmation of the theory that regards manganese as an important factor in physiological processes. (Compt. rend.).

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Phar.D.
Virgil Coblenz, A.M., Ph.D.
Wilber G. Compher, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heebner, Phm.B., Ph.G.
Henry B. Kauffman, B.Sc., Phar.D.
E. J. Kennedy, Ph.C.
George Kraemer, Ph.G., Ph.D.
Edward Kremers, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.

• CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 34 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTOR

Stewart Leroy McCurdy, A.M., M.D.
Joseph L. Morrison.
Oscar Oldberg, Phar.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Peed, M.D., C.N.
Edsel L. Ruddiman, Ph.M., M.D.
Henry H. Rusty, M.D.
Samuel P. Sadtler, Ph.D.
L. E. Sayre, B.Sc., Ph.M.
Wilbur L. Seville, Ph.G.
William S. Smith, Ph.D., M.P.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wulling, Ph.G., Ph.M.D.

JUNIOR COURSE. LECTURE No. 7.

Inorganic Chemistry.

The Study of the Elements. Hydrogen.

Among the numerous facts which may be learned about each of the elements, there are some of especial importance which the student should endeavor to fix permanently in his memory.

1. In order to be able to write and comprehend equations representing the chemical activities of the element, he must be acquainted with its symbol and valence, and if he would understand its relation to the other elements, he must remember its atomic weight.

2. He should be familiar with an outline of its history, and with the derivation and meaning of its name, since these frequently throw important light upon its characteristics.

3. He must know its principal natural sources, and the principal methods of extracting the element or obtaining it in the free state.

4. Its physical and chemical properties should be thoroughly studied, both from the text and by experiment, and its principal uses learned.

5. He should be able to name its principal compounds with Hydrogen, Oxygen, the Halogens, and with other important elements, understand the methods of their preparation, and acquaint himself with their properties and principal uses in science and the arts, and especially with their pharmaceutical and medicinal applications.

6. Finally, since the pharmacist of the future will be expected to determine the quality and purity of the substances in which he deals, he should make himself familiar with the characteristic reactions of each element, and with the means of detecting and identifying it in its different combinations.

In the arrangement of the subsequent text, these requirements have been kept in view, and the several important points mentioned placed in such order as to be most readily recognized.

HYDROGEN.

Symbol, H. Valence, 1. Atomic Weight, 1. Specific Density, 1.

Historical.—The gas was first observed by Paracelsus in the sixteenth century, but its elementary nature was not understood until it was rediscovered by Cavendish in 1776, who named it inflammable air, and at a later date also proved it to be one of the constituents of water. The name is from the Greek *hudos*, or *gennaos*, I generate, and was proposed by Lavoisier in allusion to the fact that water is produced when hydrogen burns in air.

Natural Occurrence.—Its most abundant source in nature is water, of which it constitutes about one-ninth by weight. It is an important constituent of organic matter, and in combination with nitrogen, carbon and oxygen, is found in nearly all vegetable and animal substances. It has been found free in small quantities in volcanic gases, in gases issuing from petroleum wells,

and is likewise contained in meteorites, some of the latter having yielded as much as two and a half times their volume of the element. This has been thought to indicate the origin of the latter bodies in regions filled with hydrogen under pressure. It is shown by the spectroscopic to be present in the chromosphere of the sun in large quantities, and also as a constituent of some of the stars.

Preparation.—1. By electrolysis. Pure hydrogen may be prepared by passing a current of electricity through water acidulated with sulfuric acid, the purpose of the acid being to make the water a conductor of electricity. (Fig. 14). The hydrogen is evolved at the negative pole



Fig. 14.—Decomposing Water by Electrolysis.

the metal as fast as formed dissolves in water to form the hydroxide.

4. By the action on metals of acids containing hydrogen.—This is the method most commonly employed in the laboratory. (Fig. 15). Dilute sulfuric or hydrochloric acid with zinc or iron yields quickly an abundant supply of the gas, the metal taking the place of the displaced hydrogen of the acid.

2. By decomposition of steam.—When superheated steam is passed over red hot carbon, as coke or anthracite coal, it is decomposed, producing a mixture of hydrogen and carbon monoxide, constituting the so-called water gas.



Heated metals and the oxides of certain metals behave in the same way.

3. By the decomposition of water by metals.—Certain metals, such as sodium and potassium, have so great an affinity for oxygen that when thrown upon water they decompose it, uniting with the oxygen to form an oxide of the metal, and setting free hydrogen. The oxide of

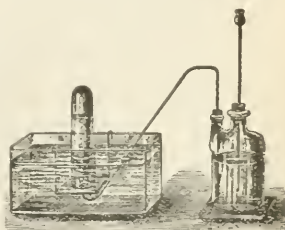


Fig. 15.—Generating Hydrogen by Action of an Acid on a Metal.



The zinc sulfate and ferrous chlorid of these reactions are examples of *substitution products*, having been formed from their respective acids by the substitution of a metal for their hydrogen.

Physical Characters.—When pure, hydrogen is a colorless, odorless and tasteless gas, but as commonly prepared, usually possesses an odor derived from impurities in the materials employed. It is not poisonous, and can be respired with safety if there be sufficient oxygen present to supply the necessities of the body. It is the lightest substance known, being nearly fourteen and a half times as light as common air. One liter at standard pressure and temperature weighs 0.0895—Gm. It is only sparingly soluble in water.

Hydrogen is the most resistant of the gases to condensation. Its liquefaction has been reported at various times, but with more or less uncertainty, until finally settled by the experiments of an English chemist, Prof. James Dewar, by whom it was liquefied in May, 1898. For this purpose the gas was subjected to a pressure of 150 atmospheres in a vessel cooled below -265°C ., and was then permitted to escape from a nozzle, when the cooling due to the sudden expansion caused it to condense to a liquid. It is described as a clear, colorless liquid, with a well defined meniscus when contained in a tube, and boiling at -240°C ., a temperature so low that a tube closed at the bottom and inserted in the liquid is filled with solidified air produced by the intense cold.

A peculiar property of hydrogen is its power of penetrating and being absorbed by certain metals at high temperatures. Palladium absorbs when cold 376 times, and at a red heat nearly 1,000 times, its own volume of the gas. The same phenomenon occurs with iron, platinum and other metals, but in less degree.

Hydrogen has been selected as the basis of three kinds of measurement, quite distinct from each other. Its combining power has been chosen as the unit of valence, sometimes called a bond; its density as the unit of comparison for the density of other gases; and the weight of its atom, called a *microerith*, as the unit for the atomic weight of other elements.

Chemical Properties.—Hydrogen is combustible in air, but will not support the combustion of the substances ordinarily combustible in the atmosphere. Like other combustible gases, hydrogen when mixed with air is extremely explosive, and must be handled with great care when in quantity. It is contained in all acids, and is the part given up when the acid unites with a metal to form a salt. Since hydrogen occupies the same place in an acid that a metal does in a salt, acids may very properly be regarded as "salts of hydrogen."

Hydrogen in combining with oxygen, i. e., in burning, gives out more heat than any other known substance. The combustion of one gram of hydrogen yields sufficient heat to raise 34,462 grams of water from 0° to 1° Centigrade, or 34,462 gram calories. (A gram calorie is the amount of heat necessary to raise the temperature of one gram of water one degree.)

Uses of the Element.—The free element has but little use outside of the experimental laboratory. On account of its exceeding levity, it has been used for filling balloons, but escapes through the envelope more readily, and is also much more expensive than the coal gas which is now generally employed for that purpose.

Nascent hydrogen is frequently employed as a reducing agent in organic chemistry. By the *nascent state* is understood an element in the act of being released from its compounds. When in this condition, elements are noted for their exceptional activity, being able to form many combinations impossible between elements in the free state.

Compounds of Hydrogen.—With oxygen, hydrogen forms two important compounds. These are hydrogen monoxid, or water, H_2O , produced by the combustion of hydrogen in air, and hydrogen dioxid, or "peroxid," H_2O_2 , both of which will be more fully considered under the compounds of oxygen.

Hydrogen is an essential constituent of all acids. With a number of non-metals, as chlorine, sulfur, etc., it combines to form compounds having acid properties, and

therefore known as the hydrogen acids, or *hydroclids*. With certain other non-metals it forms compounds having basic properties, as ammonia, NH_3 ; phosphine, PH_3 , etc. With carbon it unites in different proportions to form a large number of compounds known as the hydrocarbons. All of these compounds will receive consideration under their appropriate elements.

PRACTICAL STUDIES.

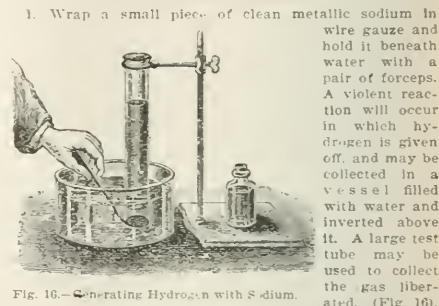
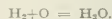


Fig. 16.—Generating Hydrogen with Sodium.

The reaction probably occurs in two stages, the oxid of the metal being first formed, which immediately unites with another molecule of water to form the hydroxid and then dissolves, as follows:



2. Holding the mouth of the vessel, containing the gas, downward, bring a light to its lower end. The hydrogen burns with a nearly colorless flame, water being the product:



If the gas be mixed with a sufficient supply of air, a slight, but harmless, explosion will occur. If the vessel be large, the explosion may be dangerous.

3. If a pair of voltaic cells are at hand, bring their opposite electrodes into a vessel of water acidulated with sulfuric acid, and invert over each electrode a large test tube of water. The galvanic current will decompose the water into its two constituents, which rise into the tubes. Note that one tube contains about twice the volume of gas that the other does.

Bring the mouth of the tube containing the greater proportion of gas into contact with a flame. Note what occurs, and write the equation which explains the reaction. Into the other tube insert a splinter or match with a glowing end. The live coal will ignite and burn with great brilliancy proving the gas to be oxygen.

4. Place the flask provided with funnel and delivery tubes, (Fig. 17), some granulated zinc and add sulfuric acid diluted with six to eight times its volume of water. (NOTE: In diluting sulfuric acid, *always add the acid to the water*, never the reverse.)

If the zinc be pure, the reaction will proceed slowly. To hasten the evolution of the gas add a few drops of a solution of cupric sulfate, which, by the deposition of metallic copper upon the zinc in some obscure way, aids the reaction.

After all the air has been expelled from the apparatus, which will require a minute or so, if the flask is not a large one, ignite the issuing stream of hydrogen.

If a further supply of gas is required, it may be collected by placing the end of the delivery tube under a vessel filled with water and inverted in a pneumatic trough.

5. Instead of the flask, a test tube about twelve centimeters long may be used to contain the zinc, water and acid. By bringing the mouth of the tube to a flame, the issuing gas will take fire and burn within the tube with a nearly colorless flame. An empty tube inverted over the generator tube, the flame being extinguished, will become filled with the gas, mixed with air, which on contact with flame will ignite with a slight explosion.



Fig. 17.—Student's Hydrogen Generator.

JUNIOR COURSE. LECTURE No. 8.

Pharmaceutical Physics.

Diffusion. Properties of Fluids.

Diffusion of Gases.—If two vessels containing gases of different densities are connected by a narrow passage, there will be a movement of molecules from each vessel to the other until eventually the two gases are evenly mixed throughout. This mixing occurs even if the vessel containing the lighter gas be placed above the vessel containing the heavier one.

Gaseous diffusion is due mainly to molecular motion, since adhesion between the molecules of gases must be regarded as very slight.

Diffusion of Gases Into Liquids.—When a gas is confined in contact with a liquid, diffusion into the latter occurs, the extent of the diffusion depending upon pressure, adhesion and temperature.

In general the amount of gas diffused, or dissolved, in the liquid is proportional to the pressure. Doubling the pressure doubles the amount of gas dissolved, and so on.

Adhesion is also an important factor, independent of the pressure applied, and the amount of gas dissolved will vary greatly in consequence. Where the adhesion is great, as between water and ammonia, the liquid may absorb hundreds of times its own volume of the gas. Where the adhesion is slight, as between water and nitrogen, the amount dissolved may be very small.

It is probable that chemical attraction also has something to do with the ready solubility of such gases as ammonia and carbon dioxide.

Diffusion of Gases Into Solids.—Nearly all solids possess the property of absorbing, or "occluding" gases, the latter being apparently condensed upon the surface of the solid. A platinum vessel allowed to stand a few minutes will gain perceptibly in weight from the air condensed on its surface. In the form of fine powder platinum is said to be able to occlude 250 times its own volume of oxygen.

Porous substances, as charcoal, have remarkable powers of gaseous absorption, and hence are valuable as a means of atmospheric purification. Carbon monoxide diffuses readily through red hot iron. The most remarkable example of the diffusion of gas into a solid is seen in the reaction between palladium and hydrogen, in which the metal may absorb nearly one thousand times its volume of the gas.

Diffusion of Liquids.—Adhesion plays a most important part in the mixing of liquids. Where two liquids, as water and alcohol, are brought into the same vessel, if the adhesion between the two kinds of molecules is greater than the cohesion between each kind, the two liquids will diffuse into each other and form a homogeneous mixture. Such diffusion will take place slowly, or immediately with agitation. Mutually diffusible liquids are termed "miscible."

If the cohesion between each kind of molecules is greater than adhesion between the two, the liquids will remain separate, the heavier at the bottom, and if shaken forcibly together, will separate on standing. Such combinations are termed "immiscible," as glycerin with ether, water with oil, etc.

Diffusion of Solids Into Liquids.—The solution of a solid in a liquid is, in general, a phenomenon of diffusion, depending upon the relative forces of cohesion and adhesion. When cohesion in the solid is stronger than its adhesion for the liquid, diffusion, or "solution," does not take place, and the substance is said to be insoluble. If adhesion is the stronger, diffusion occurs, and the solid is said to dissolve.

If the occurrence of solution was independent of adhesion, it is difficult to understand why a solid should not be equally soluble in all liquids, since all gases are equally diffusible into each other.

The effect of adhesion also explains why a powdered solid should dissolve more rapidly than one in lumps. Adhesion is due to surface action, and the surface of a solid is greatly extended by reducing it to fine particles.

Diffusion Through Membranes.—An important kind

of diffusion is that which takes place in solutions separated from each other by parchment paper or animal membranes.

If a bladder, showing no sensible pores under the microscope, be filled with strong salt solution, a narrow tube inserted in its mouth and tied fast, and the arrangement suspended with the bladder under water, there will in course of time be a rise of liquid in the tube, showing the entrance of water from the outside. Fig. 14). If the water in the outer vessel be tested, it will show the presence of salt. If the bladder be filled with water and immersed in salt solution, the liquid in the tube will fall, and acquire the taste of salt, showing an outward passage of salt.

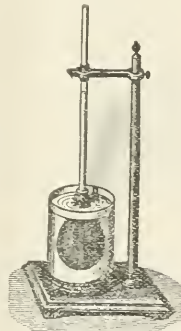


Fig. 14.—Diffusion through Animal Membrane.

we must regard the passage of the salt and liquid in osmosis as taking place through the insensible pores or intermolecular spaces in the membrane.

Substances which crystallize easily, as the various chemical salts, and chemically related substances, diffuse through membranes readily. Uncrystallizable, glue-like, or amorphous substances do not diffuse, or only with great slowness. For the first class, Prof. Graham has proposed the term *Crystalloids* and for the second *Colloid*. It is evident, therefore, that osmosis offers a method of separating crystalloids and colloids from each other.

Osmosis is likewise concerned in the extraction of the soluble portions of vegetable drugs from the box-like cells of cellulose in which they are locked. The solvent penetrates the cell, becomes saturated with the soluble portion, and thus disturbs the osmotic equilibrium, which can be restored only by the diffusion of the dissolved substance outward through the cell wall.

Osmotic Pressure.—Generally, but not invariably, the greater amount of osmosis will be from the less dense liquid to the denser one. A dense liquid in the dialyzer, as syrup, will gradually increase in volume, while decreasing in density. By appropriate means it can be shown that this increase in volume, if restrained by pressure, may exert a force equal to three or four atmospheres. This exhibition of force is known as *osmotic pressure*.

From the circumstance of osmotic pressure, and allied phenomena, it has been thought that substances in solution are in a state of partial dissociation, whereby their molecules are able to act as if they were in the gaseous state. This view is strengthened by the fact that, in general, dissolved substances obey the laws of Boyle and Gay Lussac. (See *Pneumatics*).

Influence of Temperature.—Heat has, in general, an important effect upon diffusion phenomena. In the case of the diffusion of gases into gases, and liquids into liquids, raising the temperature accelerates the action by increasing the rate and range of the molecular motions. The same effect is usually observed in the diffusion of solids into liquids, or solution, but this is not invariably so, a few substances being less soluble in hot than in cold liquids. In the case of diffusion through membranes, the osmotic pressure, and consequently the rate of diffusion are proportionate to the absolute temperature.

The diffusion of gases into liquids is usually interfered with by raising the temperature, most gases being less soluble in hot than in cold liquids. If the gas is already in solution, raising the temperature will cause its ex-

pulsion, unless this be restrained by pressure. Certain melted metals, however, as silver and copper, have the property of absorbing large quantities of oxygen, while in the molten state, which they give off, almost explosively, when cooling.

Pharmaceutical Appliances: The Dialyzer.—For the practical application of the principle of osmosis to the separation of crystalloids and colloids, an apparatus termed a dialyzer is employed. This may be of various forms, but a common one is in the shape of a deep hoop, as the rim of a sieve, across one side of which a piece of parchment paper is tightly drawn. The material to be separated is placed in the dialyzer and the latter floated on or suspended in water contained in a larger outer vessel. (Fig. 15).

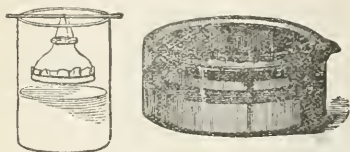


Fig. 15.—Dialyzers.

If, for example, the dialyzer contained an acidified infusion of an alkaloidal drug, the salts of the alkaloid would pass outward through the membrane, and could thus be obtained by evaporation of the water in the outer vessel, while the colloidal matter of the infusion would remain in the dialyzer.

The process may be made use of by toxicologists to separate crystalloidal poisonous substances from mixtures of organic matter, which would interfere with their identification by chemical tests.

The form of the dialyzer is of minor importance. All that is necessary is the means of dividing the liquids to be subject to osmosis by means of an appropriate membrane. An very efficient dialyzer is the inverted funnel shown in Fig. 21.

Osmosis forms an important part in the animal economy. It is by this process that the nutrient portions of the food pass from the intestinal cavity into the blood vessels, and from the latter to the tissues. In like manner, it is by osmosis that the tissues discharge their waste products back into the blood. Osmosis is also the method by which the roots of plants absorb materials from the soil, and one of the forces by means of which the ascent of sap from the roots to the highest part of the tree is accomplished.

PROPERTIES AND LAWS OF FLUIDS.

Fluids.—Because of the mobility of their particles and their possession of many physical properties in common, liquids and gases are classed together under the general name of *Fluids*.

It is usual to consider the mechanical properties of fluids under three heads or titles, *Hydrostatics*, *Hydrodynamics* and *Pneumatics*.

Hydrostatics treats of the properties of liquids at rest, or in a state of equilibrium. **Hydrodynamics**, or **Hydrokinetics**, treats of liquids in motion. **Pneumatics** treats of the mechanical properties of *Gases*. In the study of liquids, water is adopted as the type, and is always understood unless some other liquid is mentioned. Air is, in the same way, adopted as the type of gaseous fluids.

Surface of a Liquid at Rest.—The surface of a liquid at rest always conforms to the curvature of the earth. For surfaces of small area this may be regarded as practically a plane, except where the liquid touches the walls of the vessel. For large areas, as the ocean, the curvature amounts to eight inches for the first mile from any stated point, and increases thereafter as the square of the distance.

Increase of Pressure with Depth.—In an incompressible fluid, pressure is proportional to the depth. Taking the pressure at any given depth, then at twice that depth the pressure will be twice as great; at three times the depth, three times as great, and so on. This is the rule for liquids, since these are practically incompressible.

With gaseous fluids, as the atmosphere, the pressure

will increase more rapidly than the depth, since, owing to their compressibility, the lower layers are much denser than those above them, and are consequently much heavier for equal thicknesses.

Pressure Equal in All Directions.—At any given point in a fluid the pressure is equal in every direction. If the downward pressure at that point is equal to a certain number of grams or kilograms, then the upward pressure and the pressure in every other direction will be the same number of grams or kilograms. That this must be true is evident from a consideration of the fact that if the pressure should be greater in one direction than another, the fluid would necessarily flow in the direction of the least pressure, until equilibrium was restored, which could only be when the pressure became equal in all directions.

Balanced Columns of Liquid.—If several columns of a liquid are connected at their bottoms, the liquid will

stand at the same level in each, no matter what their respective diameters or forms may be. (Fig. 16). Since pressure is proportional to depth, if the liquid in one column stood higher than in another, its greater downward pressure would be unbalanced, and a current would be set up to the other columns until the pressure at the bottom of each should be equal, which would be when their surfaces were at the same altitude.

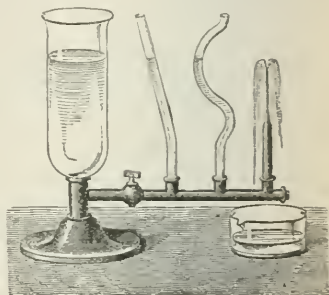


Fig. 16.—Balanced Columns of Liquid.

It is owing to this principle that the water in the water gauge of a steam boiler does not rise above the level in the boiler, or that the water in the spout of a tea kettle does not rise above that in the kettle.

Transmission of Pressure in Fluids.—When pressure is applied to a solid, as a block of wood, the whole body tends to move in the direction of the force. There is no lateral pressure or spreading out, unless a crushing

force be applied. But pressure applied at any point of a fluid confined in a vessel is transmitted instantly and without diminution in every direction. If the area pressed upon is 1 Cm. and the pressure applied is 1 Gm., then every

other centimeter of the inner surface of the vessel will receive a pressure of one Gm. The total pressure on the inside of the vessel, therefore, will be as many grams as its walls measure centimeters in area. (Fig. 17).

Pressure Due to Height of the Column and Area Pressed Upon.—As a further consequence of the law that pressure is proportional to depth and is transmitted equally in all directions, the pressure upon the bottom or side of a vessel is dependent upon the area pressed upon, and the height of the liquid in the vessel, and is independent of the diameter of the column of liquid.

In every case the pressure will be equal to the weight of a column of liquid whose cross section is equal to the area pressed upon, and whose height is the greatest height of liquid in the vessel. If the area pressed upon is 10 square centimeters and the height of liquid in the vessel is 100 centimeters, then the pressure will be equal to the weight of a column of liquid of the same dimensions. The actual cross section of the column may be very much less.

To Calculate the Pressure of a Liquid on Its Container.—To calculate the pressure on the bottom of

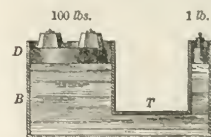


Fig. 17.—Transmission of Pressure in Liquid.

a vessel, multiply the area pressed upon by the greatest depth of liquid in the vessel.

To calculate the pressure on the side of a vessel, multiply the area of the side by the distance from its middle point to the surface of the liquid.

In the latter case the average depth is taken, because the pressure at the top of the side will necessarily be less than at the bottom. In each calculation the product gives the size of the column of liquid whose weight is equal to the pressure upon the area calculated.

Buoyancy.—The subject of buoyancy, or the loss in weight of bodies immersed in liquids, will be considered in connection with the subject of Specific Gravity.

Hydrodynamics.—Though of great importance to the science of engineering, hydrodynamics is scarcely of sufficient applicability to pharmacy to justify its consideration.

PHARMACEUTICAL APPLICATIONS.

Pressure Perculator.—Advantage is taken of the fact that pressure depends upon the area pressed upon and the greatest height of liquid in the vessel in the manufacture of a particular style of pressure perculator for pharmaceutical use. After the perculator has been packed, the top is tightly closed, and connected by a flexible tube to a reservoir of menstruum, which, by means of a pulley, can be raised to the ceiling. When the apparatus is in operation, the pressure upon the upper surface of the drug will be the same as if it were pressed upon by a column of liquid of the same diameter as the perculator, and as high as the reservoir.

The Hydraulic Press.—A practical application of the power of fluids to transmit pressure equally in all directions is shown in the construction of the Hydraulic Press, an apparatus used to some extent in manufacturing pharmacy, with which it is possible to exert enormous pressure through a short distance. In its simplest form it consists of two connected cylinders differing greatly in diameter, each containing a moveable piston. The smaller of the cylinders and pistons constitute a pump

wards. The latter is made to carry a platform upon which is placed the article to be submitted to pressure. (Fig. 18).

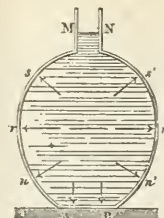


Fig. 18.—Pressure on Bottle Filled with Liquid.

wards. The latter is made to carry a platform upon which is placed the article to be submitted to pressure. (Fig. 18).

Ignoring friction and other losses, any pressure applied to the pump will exert as much greater pressure upon the larger piston, as the area of the latter is greater than the area of the pump piston. If the ratio is as 1 to 100, then a force of 100 KGm. applied to the smaller would cause a pressure of $100 \times 100 = 10,000$ KGm. at the other.

The operation of this machine does not conflict with the law of conservation, since, although the force is multiplied 100 times, the energy is not increased. In fact, there is always a considerable loss of energy, due to friction and imperfections in the apparatus, so that the amount of work done by the machine is invariably less than the work done upon it.

Bursting of a Bottle Filled with Liquid.—The incompressibility of liquids and the fact that pressure is transmitted equally in all directions explains why it is so easy to burst a bottle by attempting to insert a cork when it is filled to the brim. Presuming the lower surface of the cork to have an area of 1 cm., and the inner surface of the bottle an area of 200 cm., then, according to the above principle, a pressure of 1 KGm. on the cork would produce a total outward pressure of 200 KGm. on the bottle. (Fig. 19).

An old and well worn illustration of this principle is the bursting of a cask by inserting into its head a pipe of small diameter and filling it to the top with water. The pressure on the bottom and sides of the cask being the same as if the pipe has as large a diameter as the keg, is too great for the strength of the latter and causes its rupture. (Fig. 20).



Fig. 20.—Bursting of a Cask by Pressure of Liquid.

PRACTICAL STUDIES.

Arrange a dialyzer as shown in Fig. 21. For the membrane use parchment paper. Hold the paper to the light, and if any holes appear, stop them with collodion. Fill the dialyzer with a strong solution of common salt, well up into the neck of the funnel, and suspend in a vessel of clear water. Examine every hour or so for twenty-four hours. Does the salt pass through into the outer vessel? Has there been any passage of water from the outer vessel into the dialyzer?



Fig. 21.—Funnel Dialyzer.

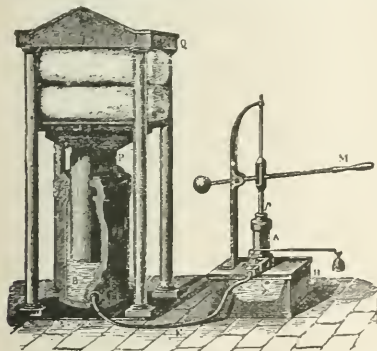


Fig. 18.—Hydraulic Press.

whereby a liquid, generally water, can be forced into the other cylinder, thereby forcing the larger piston up-

SENIOR COURSE. LECTURE No. 7.

Official Preparations.

SYRUPI. The Syrups.

Syrups are concentrated solutions of sugar in water, with or without the addition of flavoring or medicating ingredients. They are closely allied to the Honeys, of which the basis is a natural syrup.

Honeys and Syrups are the descendants and survivors of the older oxymels and linctures which still prevail to some extent in European pharmacy. A linctus or lincture is a thick mixture of honey or syrup with dry medicating substances in the form of powder. In true

syrups the medicating substances are in solution. Oxymels are mixtures of honey with a medicinal vinegar. In the United States Pharmacopoeia the nearest approach to an oxymel is found in those syrups which contain acetic acid.

The official syrups may contain either volatile or non-volatile substances dissolved in water, and hence correspond to Waters, Solutions or Infusions, plus the addition of sugar.

The office of the sugar is two-fold, to make the preparation palatable and to aid in its preservation. In order to be permanent, a syrup consisting of easily decomposable organic substances should contain from 65 to 85 per cent. by weight of Cane Sugar. If the syrup contain other ingredients which are themselves preservatives, the amount of sugar may be reduced. Generally a less quantity is necessary in those syrups which contain alcohol, glycerin or other natural preservatives, or in which the medicating substances are largely or mainly inorganic.

An excess of sugar is almost as harmful as a deficiency, since if the liquid be super-saturated the excess will crystallize out, and crystallization when once set up, may continue until the syrup is so weakened that fermentation may take place. Since sugar is less soluble in alcohol than in water, the addition of alcoholic liquids to syrups increases the tendency to crystallization.

The sugar employed for official syrups should be strictly of the quality prescribed under that title in the Pharmacopœia, that is, the best variety of granulated sugar, free from moisture, glucose, invert sugar, or artificial coloring matter. Certain pigments, such as prussian blue, ultramarine, etc., are frequently added for the purpose of increasing the whiteness of an inferior article. The presence of moisture does not preclude the use of the sugar, provided the amount of water is determined and allowance made for it. The less pure the sugar, the greater will be the liability to fermentation in the syrups made from it.

Preservation of Syrups.—The changes which many syrups undergo on keeping for some time may be either precipitations or alterations due to imperfections in the formulae, or fermentation due to the growth and multiplication of certain micro-organisms, which convert the sugar present into alcohol. The first class of changes are generally unpreventable save by a modification of the formula. Changes of the second kind can be prevented by the use of sterilizing agencies, which either destroy or hinder the growth of the fermentation-producing organisms. Of these agencies there are two kinds, chemical preservatives and heat.

It may be stated generally that the addition to syrups of preservative agents, as alcohol, salicylic acid and the like is objectionable.

Certainly is this true in the case of the official syrups. The physician has the right to insist that his patient shall receive only those agents which have been ordered in the prescription and nothing else.

In cases where the use of heat is not objectionable, syrups may be preserved indefinitely in the following manner: Small, perfectly cleaned bottles are filled to the neck with syrup, placed in a vessel of cold water, and the water in the vessel heated to the boiling point and maintained there for some time. While still at the boiling temperature the bottles are closed with corks which have been sterilized by boiling water. On cooling there will commonly be a condensation of vapor in the upper part of the bottle, which will run down the sides and form a thin layer over the top of the syrup. After the bottle is entirely cold this upper stratum should be reincorporated by shaking.

Perhaps the best plan of all is to avoid making the easily fermentable syrups in larger quantities than will be consumed before they have time to decompose.

Preparation of Syrups.—The official Syrups are made by the following methods:

- (1) The sugar is dissolved in water or in the medicating liquid with the aid of heat. This is known as the *hot process* of making syrups.
- (2) The sugar is dissolved by percolation or by agitating it with the water or medicating liquid, without the aid of heat. This is the *cold process*.
- (3) The syrup is made by the admixture of the medicating liquid and simple syrup.

Frequently it is desired to make syrups from alcoholic liquids, as tinctures and spirits, which contain resins, volatile oils or other substances insoluble or only slightly soluble in water. One of the following methods is followed in such cases: (a) If the resinous substance is inert or not desired in the syrup, it is gotten rid of by diluting the liquid with water and filtering out the pre-

cipitated resin after subsidence. (b) If the resin is an active substance it may sometimes be retained in solution by the use of an alkaline substance, as potassium carbonate, with which it may combine to form a water-soluble compound. (c) The solution of the substance is aided by the fine state of division obtained by first triturating the alcoholic solution with precipitated calcium phosphate, which is then percolated with water, as in the manufacture of the medicated waters.

Hot Process of Making Syrups.—In making syrups by the hot process the sugar is placed in a suitable vessel, the required amount of liquid added and heat applied until the sugar is dissolved, solution being aided by stirring. The syrup is then raised to the boiling point and strained, enough water being added through the strainer to bring the finished syrup to the required measure. Syrups made by the hot process, provided the heat be not too long continued, are less liable to ferment than those made without the use of heat. The heat also serves to drive off the dissolved oxygen of the water, and the syrups thus made are less liable to change through oxidation. Prolonged application of heat, however, especially in the presence of acid or mineral ingredients increases the liability to ferment through formation of invert sugar, a glucose-like body readily fermentable.

Cold Process of Making Syrups.—When the medicating substance is volatile, or easily decomposed by heat, the cold process is used. The sugar and liquid are placed together and frequently agitated or stirred until solution results. If the solution is accomplished in a bottle, it is advantageous to lay the latter upon its side in the intervals between shaking, since by this method a larger surface of sugar is exposed to the action of the solvent than if the bottle stood upright.

Another variety of the cold process is by percolation. A tapering piece of coarse sponge is pressed into the neck of a funnel or percolator so as to be about half an inch below the beginning of the neck. The sugar is poured into the percolator and made level without shaking or jarring. The required liquid is then poured on the sugar and the flow regulated by the control tube until the liquid runs out in rapid drops, being returned to the percolator, if necessary, until it passes clear. At the end of the operation the percolator is rinsed with sufficient water or other menstruum to make the required measure of syrup.

The advantage of percolation over simple agitation of the liquid and sugar in a bottle is that the syrup is ready strained as it drops into the container. Care must be taken not to use too fine a sponge, or to press it too tightly into the neck of the percolator, or to pack the sugar by shaking or jarring, otherwise the flow may proceed too slowly or cease altogether. The percolation method is given as an alternative process in many of the official formulae.

Simple Admixture Process.—The manufacture of syrups by the simple admixture of syrup and the medicating liquid is too simple to require comment.

Classification of Official Syrups.—The official syrups are thirty-two in number. The following classification is intended as an aid in understanding and remembering their composition and process of manufacture, and the purposes for which they are to be used. According to the character of their most important ingredients, the official syrups may be divided into three sub-classes, as follows:

- (1) Syrups of Organic Substances.
 - (2) Syrups of Inorganic Substances.
 - (3) Syrups of Both Organic and Inorganic Substances.
- Each of these sub-classes is divided into smaller groups based upon other characters.

The pharmacopœial formulas all require that the syrups shall be brought to a final volume of 1000 Cc., except in the following instances: Syrup of Acacia to 100 Cc., and Syrups of Ferrous Iodide and Hydriodic Acid to a weight of 1000 Gm. In all cases after the last addition of water or syrup, the whole must be mixed thoroughly together by shaking. Generally, where a syrup is made by dissolving sugar in the medicating liquid without heat, the solution may be accomplished by the cold percolation process, if preferred.

SYNOPSIS OF OFFICIAL SYRUPS.

SUB-CLASS 1.

SYRUPS CONTAINING ORGANIC SUBSTANCES ONLY.

This sub-class includes all official syrups which when finished do not contain any inorganic substance except such as may be naturally present as constituents of the vegetable drugs, from which the syrups are made. These syrups do not admit of an exact sub-division, but may be conveniently grouped for study according to the methods employed in their preparation, and the character of the substances they are prepared from. Grouped in this way we have: (1) Syrups made by the Solution of Sugar with the Aid of Heat; (2) By the Solution of Sugar by Agitation Without Heat; (3) By the Simple Admixture of Syrup and a Medicating Liquid, and (4) By Dissolving Sugar in a Medicinal Vinegar or in a liquid containing Acetic Acid. Each of these sub-divisions may be divided into smaller groups.

1. Syrups Made by Dissolving Sugar in a Liquid with the Aid of Heat.

Syrupus. Syrup.—Dissolve 500 Gm. Sugar in 450 Cc. Distilled Water with the aid of heat, raise the solution to the boiling point and strain, passing sufficient Distilled Water through the strainer to make 1000 Cc. Syrup thus prepared should have a specific gravity of about 1.317.

This preparation is the "Simple Syrup" of the shops, and is used as a simple adjuvant or sweetening agent and in the preparation of other syrups.

Syrupus Rubi Idæi. Syrup of Raspberry.—Reduce Fresh, Ripe Raspberries to a pulp and let stand at a temperature near 20° C., until a portion of the filtered juice mixes clear with half its volume of alcohol. Express the juice, let subside in a cool place and filter. To every 40 parts by weight of juice add 60 parts of sugar, heat to boiling and strain. Avoid the use of tinned vessels. Keep in well stoppered bottles in a cool, dark place.

The object of the fermentation is to cause the precipitation of albuminous substances by the alcohol produced. The completion of the process is shown by the failure to produce a precipitate when mixed with a further amount of alcohol.

The syrup is used entirely for flavoring purposes.

Syrupus Picis Liquide. Syrup of Tar.—Wash 75 Gm. Tar by mixing with 100 Gm. White Sand and 150 Cc. Water and stir frequently during twelve hours. Pour off and reject the liquid. To the residue add 400 Cc. Boiling Distilled Water, stir frequently during fifteen minutes, add 100 Cc. Glycerin and stir occasionally for twenty-four hours. Decant the clear solution, filter, add 500 Gm. Sugar and dissolve with gentle heat. Cool, strain and add Distilled Water through the strainer to make 1000 Cc.

The object of the preliminary washing is to remove acetic acid and certain other irritant constituents of the tar. The addition of sand enables the water to penetrate

the mass and exercise its solvent action upon a larger surface of tar than it would otherwise be able to do.

Syrupus Sarsaparillæ Compositus. Compound Syrup of Sarsaparilla.—Mix together 200 Cc. Fluid Extract of Glycyrrhiza ana Senna, and 0.1 Cc. each of the Oils of Anise, Sassafras and Gaultheria, and add sufficient water to make 600 Cc. Let stand an hour to precipitate resinous matters, filter and dissolve in the filtrate with a gentle heat 650 Gm. Sugar, cool, strain and add water through the strainer to make 1000 Cc.

2. Sugar Dissolved in the Medicating Liquid Without Heat.

Nine official syrups are directed to be prepared by dissolving sugar in the medicating liquid without the aid of heat, or without a heat above 60° C. This may be accomplished either by placing the sugar and liquid together in a bottle and agitating frequently, or by pouring the sugar in a percolator and allowing the liquid to percolate through it as previously described. The medicating liquids employed may be Infusions, Emulsions or Official or extemporized Medicated or Aromatic Waters.

A.—Made from Extemporized Infusions.

Three of the Cold Process syrups are made from extemporized Infusions. They are Syrup of Althæa, Syrup of Wild Cherry and Syrup of Senna.

Syrupus Althææ. Syrup of Althæa.—Wash 50 Gm. Althæa cut in small pieces, in cold water to cleanse of adhering dirt, and then macerate for one hour, stirring frequently, in 400 Cc. Water and 30 Cc. Alcohol, and strain without expression. Dissolve 700 Gm. Sugar in the strained liquid, and add 100 Cc. Glycerin and sufficient water to make 1000 Cc. Keep in a cool place, in completely filled and well stoppered bottles.

Syrupus Pruni Virginianæ. Syrup of Wild Cherry.—Prepare a menstruum of 300 Cc. Water and 150 Cc. Glycerin, and with a portion of this moisten 150 Gm. Wild Cherry in No. 20 powder and macerate in a close vessel for twenty-four hours. Pack firmly in a cylindrical percolator and percolate first with the remainder of the menstruum and then with water until 450 Cc. of percolate is obtained. In this dissolve 700 Gm. Sugar, strain, and add through the strainer sufficient water to make 1000 Cc.

The active principle of this syrup is hydrocyanic acid, and the object of the prior maceration is to permit its formation by reaction of the amygdalin and emulsin of the Wild Cherry.

Syrupus Sennæ. Syrup of Senna.—To 250 Gm. bruised Alexandria Senna add 700 Cc. boiling water and digest at a temperature not exceeding 60° C. for twenty-four hours. Express and pass enough water through the residue to make 600 Cc. Strain, and when cold add 5 Cc. Oil of Coriander dissolved in 150 Cc. of alcohol. Allow to subside, pour off the clear liquid, filter the remainder and add water through the filter to make 350 Cc. In this dissolve 700 Gm. Sugar by agitation, strain, and add water through the strainer to make 1000 Cc.

SENIOR COURSE, LECTURE No. 8.

Pharmaceutical Latin.

BY PROF. WILBER G. COMPTON, A.M., PH.D.

Imperative Mood.

This Mood has two tenses, *present* and *future*. The present has but one person, the second; the future has two, the second and third.

The following is the conjugation of the preceding words in the Imperative Mood:

1st Conjugation.

Singular.	Plural.
Pres.—san-a, heal thou.	san-ate, heal ye.
Fut.—san-ato, thou shalt heal.	san-atoite, ye shall heal.
san-ato, he shall heal.	san-anto, they shall heal.

2nd Conjugation.

Pres.—misc-e, mix thou.	misc-ete, mix ye.
Fut.—misc-eto, thou shalt mix.	misc-etoite, ye shall mix.
misc-eto, he shall mix.	misc-ento, they shall mix.

3rd Conjugation.

Pres.—duc-e, lead thou.	duc-ite, lead ye.
Fut.—duc-ito, thou shalt lead.	duc-itoite, ye shall lead.
duc-ito, he shall lead.	duc-unto, they shall lead.

4th Conjugation.

Pres.—ven-i, come thou.	ven-ite, come ye.
Fut.—ven-ito, thou shalt come.	ven-itoite, ye shall come.
ven-ito, he shall come.	ven-lunto, they shall come.

Special attention must be given to the Imperative, as this is the mood used, mainly, in prescriptions.

Exercises.—Conjugate in the Imperative mood the following verbs: *Applico*, (1); *absorbeo*, (2); *accedo*, (3); *audio*, (4); *colo*, (1); *debeo*, (2); *deingo*, (1); *decanto*, (1); *sumo*, (3); *pono*, (3); *mollo*, (4).

Translate into Latin the following forms: Mix the pills. Heal the sick man. Bruise the bitter herb. Distill the water.

Infinitive Mood.

This mood has three tenses, present, perfect and future, but the time indicated is only relative. The use of the Infinitive is essentially the same in the Latin

as in English, and in general partakes of the nature of a verbal noun, and as such may be used as the subject or predicate of a sentence, the object of a verb or preposition, independently, etc. It has no modification of person and number. The following are the forms in the four conjugations:

1st Conjugation.
 Present—San-are, to heal.
 Perfect—Sanav-isse, to have healed.
 Future—San-aturum esse, to be about to heal.

2nd Conjugation.
 Present—Misc-ere, to mix.
 Perfect—Miscu-isse, to have mixed.
 Future—Misc-iturum esse, to be about to mix.

3rd Conjugation.
 Present—Duc-ere, to lead.
 Perfect—Dux-isse, to have led.
 Future—Duc-iturum esse, to be about to lead.

4th Conjugation.
 Present—Ven-ire, to come.
 Perfect—Ven-isse, to have come.
 Future—Ven-turum esse, to be about to come.

Exercise—Write the full conjugation of the following verbs in the infinitive mood: Aro, (1); careo, (2); colo, (1); consido, (3); finio, (4); ebullio, (4); doleo, (2); extendo, (3).

Before passing to the passive voice it will be necessary to learn the conjugation of the verb *sum*, corresponding to our English verb to be, as parts of this verb are used as an auxiliary in the conjugation of the perfect tenses of the passive voice. The verb is irregular.

The principal parts are:
 Present Indicative. Infinitive. Perfect Indicative.
 sum. esse. fui.

Indicative.

Present.

sum, I am.
 es, thou art.
 est, he is.

Imperfect.

eram, I was.
 eras, thou wast.
 erat, he was.

Future.

ero, I shall be.
 eris, thou wilt be.
 erit, he will be.

Perfect.

fu-i, I have been.
 fu-isti, thou hast been.
 fu-it, he has been.

Pluperfect.

fu-eram, I had been.
 fu-eras, thou hadst been.
 fu-erat, he had been.

Future Perfect.

fu-ero, I shall have been.
 fu-eris, thou wilt have been.
 fu-erit, he will have been.

Subjunctive.

Present.

sim, I may be.
 sis, thou mayst be.
 sit, he may be.

Imperfect.

essem, I should be.
 esses, they wouldst be.
 esset, he would be.

Perfect.

fu-erim, I may have been.
 fu-eris, thou mayst have been.
 fu-erit, he may have been.

Pluperfect.

fu-issem, I should have been.
 fu-isses, they wouldst have been.
 fu-isset, he would have been.

In the perfect system the stem *fu* occurs, while the endings are the same as those used in the conjugation of the other verbs.

Imperative.

Pres.—es, be thou.
 Fut.—esto, thou shalt be.
 esto, he shall be.

Infinitive.

Pres.—esse, to be.
 Perf.—fu-isse, to have been.
 Fut.—fu-turus esse, to be about to be.

Participle.

Future.
 fu-turus, a, um, about to be.

Passive Voice.

Principal Parts.
 Pres. Ind. sanor.
 Pres. Inf. sanari.
 Perf. Ind. sanatus sum.

From these parts, with the appropriate endings, is formed the passive voice. The change noted in the above is the addition of *r* in the present indicative, the change of *o* to *i* in the infinitive, and the perfect indicative formed by using the perfect participle, *sanatus*, with the verb *sum*.

Indicative Mood.

Present Tense.

1st Conj.	2nd Conj.
I am healed.	I am mixed
sanor, san-amur.	misc-er, misc-emur.
san-aris, san-amini.	misc-eris, misc-emin.
san-atur, san-antur.	misc-etur, misc-entur.

3rd Conj.	4th Conj.
I am led.	I am come.
duc-or, duc-mur.	ven-or, ven-imur.
duc-eris, duc-imini.	ven-iris, ven-imini.
duc-itur, duc-untur.	ven-itur, ven-iuntur.

Imperfect Tense.

1st Conj.	2nd Conj.
I was healed.	I was mixed.
san-abar, san-abamur.	misc-ebat, misc-ebamur.
san-abaris, san-abamini.	misc-ebatis, misc-ebamini.
san-abatur, san-abantur.	misc-ebatur, misc-ebantur.

3rd Conj.	4th Conj.
I was led.	I came.
duc-ebat, duc-ebamur.	ven-iebat, ven-iebamur.
duc-ebatis, duc-ebamini.	ven-iebatis, ven-iebamini.
duc-ebatur, duc-ebantur.	ven-iebatur, ven-iebantur.

Future Tense.

1st Conj.	2nd Conj.
I shall be healed.	I shall be mixed.
san-abor, san-abimur.	misc-ebor, misc-ebimur.
san-aberis, san-abimini.	misc-ebatis, misc-ebimini.
san-abitur, san-abuntur.	misc-ebitur, misc-ebuntur.

3rd Conj.	4th Conj.
I shall be led.	
duc-ar, duc-emur.	ven-iar, ven-iemur.
duc-eris, duc-imini.	ven-ieris, ven-iemini.
duc-etur, duc-entur.	ven-ietur, ven-ientur.

AQUEOUS SOLUTIONS OF METALLIC GOLD.—R. Zsigmondy (Annalen) gives details for the preparation of a red solution of the so-called colloidal gold. The following method generally succeeds: 25 c.c. of a solution of crystallized gold chloride (hydrogen aurichloride), containing 0.6 grm. substance per litre, are diluted with 100 to 150 c.c. of distilled water and 2 to 4 c.c. of 0.2 N-potassium carbonate or bicarbonate added. After the slightly alkaline solution so obtained has been heated to the boiling-point, and the source of heat removed, 4 c.c. of a solution of 1 part of freshly distilled formic aldehyde (b. p. 97° to 100°) in 100 parts of water are added a little at a time, but pretty rapidly, whilst the liquid is vigorously stirred. The reaction is complete in a few seconds when the originally colorless liquid assumes a bright red color. A great deal, however, seems to depend on the purity of the distilled water used. Traces of phosphates especially are objectionable. Very often the liquid obtained has a violet or blue-black color and a turbid appearance. Large quantities (2 to 3 litres) of the red solution cannot be prepared in one operation on account of the difficulty of adding the formic aldehyde sufficiently rapidly. Solutions prepared as above, and containing 0.005 per cent. of gold, can be boiled or preserved for months without undergoing any change. By subjecting the solution to dialysis in a warm place (40° to 50° C.), the foreign substances can be removed and the concentration of the gold increased to 0.12 per cent. The author then proceeds to describe at length the properties of the colloidal solution of gold, and arrives at the conclusion that the gold is actually dissolved by the water and is not merely a suspension of very finely divided particles of gold or a solution of an oxide of gold. Most mineral acids and salts precipitate the metal; agitation with mercury does not remove it from solution; fungi grow readily in the solution, etc. The absorption spectrum of the solution is also described and compared with those of ruby glass and thin films of gold. On subjecting the solution to electrolysis the gold is deposited on the positive electrode, but may be intercepted and deposited on a parchment partition between the electrodes. In 1857 Faraday prepared similar colored liquids containing gold, but considered that the gold was merely suspended in the form of excessively fine particles. After the above experiments were completed the author became aware of Faraday's work, and discusses it in an appendix. He still maintains that the red liquid consists of allotropic or colloidal gold dissolved in water.

(Special to the Era.)

THE APOTHECARIES' GARDEN, LONDON.

In the House of Commons, on July 19 last, Mr. Whitmore asked the Honorable Member for Thirsk (one of the Charity Commissioners) whether he was aware that the Society of Apothecaries could no longer maintain the Physic Garden at Chelsea, and if, in order to preserve this ancient garden, the Charity Commission would sanction its acquisition by the governing body of the City Parochial Charities, and its subsequent maintenance by them as a botanical garden.

Mr. Grant Lawson replied that the society had applied to the Charity Commissioners for the establishment of a scheme for the future administration of the trusts regulating the garden, which is now maintained at the charge of their corporate funds. They (the society) desired to be relieved from their trusteeship. The Commissioners had received from the trustees of the Charities an offer to undertake the trusteeship of the garden, and provide for its maintenance for botanical study. They (the Commissioners) proposed to publish a scheme giving effect to these propositions.

An Ancient Lease and Its Stipulations.

It was in 1722 that Sir Hans Sloane leased this piece of riverside land (3 acres 1 r. 35 p.) for 45 a year to the Master, Wardens and Society of the Art and Mystery of Apothecaries of the City of London. But this lease was granted "to the end that the said Garden may at all times hereafter be continued as a Physic Garden . . . for the manifestation of the power, wisdom and

glory of God in the works of the Creation, and that their apprentices and others may better distinguish good and useful plants from those that bear resemblance to them and yet are hurtful, and other like good purposes." The Society were to "render yearly to the President, Council and Fellows of the Royal Society of London, fifty specimens of distinct plants, well dried and preserved, which grew in their garden the same year" until 2,000 specimens had been delivered. But "if the Society shall at any time convert the Garden into buildings for habitations, or to any other uses, save such as are necessary for a physic garden," the owner (Sir H. Sloane) and his heirs should have the right to offer the land (1) to the Royal Society, and (2) to the College of Physicians, subject to the same conditions as were originally granted to the Society of Apothecaries.

Were it not for this clause, the land would probably have been built over long ago, for it is now worth £10,000 or so. And as the Royal Society and the College of Physicians have no intention of taking over the trusteeship, as botany no longer figures on the curriculum of the Licentiate of the Apothecaries' Society, it appears likely that the old Physic Garden will become a public botanical garden; unless, indeed, it falls into the builders' hands. It is curious to note that this question of how to raise money for the maintenance of the Garden has always been a difficulty with the Apothecaries' Society.

England's Oldest Existing Botanical Garden.

According to Mr. Field and Dr. Semple (whose "Memoirs" regarding the garden should be read by all interested in such matters), the first English botanic garden was that of Gerard* (1596-9); the second was formed by Tradescant, King Charles I.'s gardener, in 1630; and the third was the Apothecaries' Garden.

The land at Chelsea was first leased from Lord Cheyne by the Apothecaries' Society about 1673, for the purpose of building a barge house. In those days each City Company had its gorgeously gilt and flag-bedecked barge, in

which it escorted the new Lord Mayor from the city to Westminster—the Lord Mayor's show by water existed down to a comparatively recent date. The flags and streamers which fluttered from the Apothecaries' barge may yet be seen in their ancient City Hall; the four former respectively emblazoned with the arms of the King, the city, the society and the figure of St. Luke (patron of the healing art), while one of the two streamers is shown in the accompanying sketch.

In 1674 the garden was walled, and in 1676 planted with herbs for the laboratory. Evelyn mentions in his diary that on Aug. 6, 1685, he "went to see Mr. Watts, keeper of the Apothecaries' Garden of Simples at Chelsea, where there is a collection of innumerable varieties of that sort; particularly, besides many rare annuals, the tree bearing Jesuits' bark, which had done such wonders in quartan agues. What was very ingenious was the subterraneous heat, conveyed by a stove under the conservatory, all vaulted with brick, so as he has the doores and windowes open in the hardest frosts, secluding only the snow."

An MS. dated 1691 also describes "Chelsea Physick Garden has great variety of plants, both in and out of greenhouses; their perennial hedges and rows of different colored herbs," but mentions that it was being neglected. The society were, in fact, at this epoch (as in our own) debating whether they should not give up the garden on account of the expense.

Sir Hans Sloane

purchased Lord Cheyne's Chelsea property in 1712. Sir Hans was a wealthy and cultured London physician, who attended Queen Anne during her last illness; and was the ancestor of the noble families of Stanley and Cadogan. In Sloane street, Cadogan Square and other parts of Chelsea the names of these land owners may still be seen. Sir Hans Sloane's collection of curiosities was bought by the English Government for £20,000, and became the foundation of the British Museum. The portrait, which we reproduce, hung upon the walls of the Museum till about twenty years ago, when it found its suitable place in the National Portrait Gallery, Trafalgar Square.

Ever interested in science, and of a generous and philanthropic disposition, the Apothecaries' found him a sympathizing helper. He not only granted the lease above referred to, but on more than one occasion subscribed towards the expense of keeping up the Garden. When he died (in 1752), however, he left no legacy to the Apothecaries, and the old question of ways and means cropped up periodically.

Linnaeus

visited the garden in 1736, and writes in his diary "Miller of Chelsea permitted me to collect many plants in the



SIR HANS SLOANE.

Garden, and gave me several dried specimens collected in South America." Mr. Philip Miller, F. R. S. (Gardener from 1722 until 1770, and author of "The Gardener's Dictionary") is here referred to, and not Mr. Joseph Miller,

*An article on Gerard appeared in the Era a few months since.

who was Master of the society in 1738, and wrote the "Botanicum Officinale, or a Compendious Herbal, giving an account of all such plants as are now used in the Practice of Physick." Besides the gardener or curator, a "Præfectus Horti and Botanical Demonstrator" was always attached to the garden. His duties were to superintend the gardeners' work, to give practical botany lessons in the garden, to lead the herboring excursions, and to prepare the dried specimens annually for the Royal



The Old Cedars
at Entrance Gate,
viewed from the River

Society. It would be an interesting but lengthy task to trace the history of the gentlemen who have successively occupied this post. In 1853 the question of giving up the garden was then once more brought forward, the lectures were discontinued, the office of præfectus abolished and other economies decided upon. In 1862 the Herbarium was presented to the British Museum, but £500 was spent in doing up the garden, under the direction of Mr. N. B. Ward, F. R. S., the inventor of the "Wardian cases" for growing plants in towns. In 1874 the Chelsea Embankment was opened, and the Board of Works paid for the handsome wall railing and entrance gates which now face the river, and have replaced the old wall, etc., shown in our illustration.

A Visit to the Garden.

These new gates bear the inscription: "The Botanic Gardens of the Society of Apothecaries of London, A. D. 1673. Granted to the society in perpetuity by Sir Hans Sloane, Bart., A. D. 1723." They lie but a hundred yards or so from Carlyle's house in Cheyne Walk. Through the railings one may catch sight of the blackened and leafless form of the last survivor of the four first cedars of Lebanon ever planted in London. This dates from 1683. Two of its fellows were cut down a century ago, the other still existed when the embankment was made. The handsome evergreen oak (*Quercus Ilex*), which was another of the features of the garden, is also succumbing to the effects of the sooty atmosphere, and the noble Oriental plane has had to be considerably lopped, although the plane, as it sheds its bark frequently, is one of the few trees which can usually resist the smoky air of London.

The ancient entrance to the garden is around the corner, in Swan Walk, where one may just read the blackened inscription "Hortus Botanicus Societatis Pharmaceutice Lond. 1686," and, by ringing a primitive bell, gain admittance to the delightfully

Quaint Old-World Spot.

Sloane's statue, by Rysbrack, stands in the centre, and behind are green lawns, studded with plots of hardy herbaceous plants arranged in natural orders. In front are the greenhouses, little old-fashioned places in poor repair, but charming in their way, and fairly full of plants—*areca alba*, *aloes*, *cinnamon*, *hibiscus*, black pepper, *Indian tamarinds*, etc., may be noted at random. Here, as among the grass plots, a few vivid geraniums, *fuchsias*, etc., relieve the greenery, while on and around the extensive lawns a handsome weeping ash, a lofty plane and many other fine old trees still flourish. There are also various propagating pits, a tank for water plants, etc.

The Physick Garden

lies at the north end. Two of the beds were arranged by Dr. Lindey in 1839, according to the system laid down in his "Flora Medica." The other is planted according to

DeCandolle's system. Here, among old-fashioned plants like borage, blessed thistle, carrots, centaury, dandelion, jasmine, phlox, saxifrage, lavender, etc., etc., are to be found such foreign medicinal plants as are hardy enough to grow out of doors in London—Indian hemp, tobacco, and so on. All are grouped according to the botanical orders, and each has its Latin label. Grape vines and figs cluster on the south side of the adjoining wall, and two fine old mulberry trees were strewn the ground with luscious fruit hard by.

In fact, the Physic Garden is as pleasant and tranquil a spot as can be found in England's overgrown metropolis. With Chelsea Hospital grounds on one side, Cheyne Walk on another, and Battersea Park just over the river, it forms part of a large, green oasis in the wilderness of bricks and mortar, which it is sincerely to be hoped will be preserved. Besides,

London Needs this Garden

for botanical students. "Where can they go to?" was the remark of an old Chelsea resident. "To Kew, you will say, but not only is it far away, but they cannot visit in large groups, pluck at their ease, etc. Your botanical student, be he budding pharmacist or simple amateur, doesn't want palm houses, pagodas, lakes, lawns, greenhouses full of priceless specimens which he daren't touch. He just wants a handy garden, from which the nolsy general public are excluded, with a few good examples of each characteristic species; and above all, where he can handle and pluck about the plants as he pleases, with or without his professor. This soil is a bit sandy, but a few loads of loam and plentiful watering would make it as handsome a garden, sir, as any gentleman could boast of. Let it be known that it is to be opened to all bona fide botanical students, and you would



have a crowd here all day long. Personally, I have often wondered that Earl Cadogan, who makes a princely income out of the Chelsea ground rents, doesn't settle a few hundred pounds a year on this interesting old place. He would never know the difference, and it would be a grand place for study, sir, if it were really kept up, and not starved through lack of funds."

WOOD WITH METALLIC LUSTER.—A peculiar and certainly valuable process to impart the luster of metal to ordinary wood, without injuring its natural qualities, is described in the *Paris Annales Forestieres*. (Sci. Am.) The wood is laid, according to its weight, for three or four days in a caustic alkaline solution, such as, for instance, of calcined soda, at a temperature of 75° to 90° Celsius. Then it is at once placed in a bath of calcium hydrosulphite, to which, after twenty-four to thirty-six hours, a saturated solution of sulphur in caustic potash is added. In this mixture the wood is left for forty-eight hours at 35° to 50° Celsius. It will be seen from this description that the process is somewhat laborious, and requires much time, but the effect is said to be astonishing. When the wood thus prepared, after having been dried at a moderate temperature, is polished by means of a smoothing iron, the surface assumes a very handsome metallic luster. The effect of this metallic gloss is still more pleasing if the wood is rubbed with a piece of lead, zinc or tin. If it is subsequently polished with a burnisher of glass or porcelain, the wood actually gains the brilliancy of a metallic mirror, whereby, of course, handsome effects in woodware can be obtained. Withal, the wood remains very firm and durable.

CRUDE CAUSTIC SODA SOLD IN THE MARKET AS CAUSTIC POTASH.*

BY CARL E. SMITH.

In the course of an investigation into the quality of commercial crude caustic potash, the writer has recently examined five samples that proved to be nothing more nor less than caustic soda of varying degrees of purity. Dr. Charles Rice, who requested the writer to investigate this subject, obtained these samples from various sources through which the grocery trade is supplied. They appear to be representative of what is sold in New York city as potash to such consumers as are not supposed to test their purchases chemically. The potash present was no larger in amount than that which crude soda might naturally contain, and in some cases the quantities of chlorides and sulphates were extraordinarily large. As the two alkalies rather closely resemble each other physically, such a substitution may easily be overlooked, and, as some of these products present a very good appearance, pharmacists may sometimes be tempted to use potash obtained from such sources for the preparation of potassium bromide or iodide, soft soap, etc., without considering a previous chemical examination necessary. In some such cases the substitution may not even be detected during the process of manufacture, as in the case of soft soap.

The following table indicates the composition of the five samples, the potash calculated as sulphate, in accordance with a rule formulated by Fresenius:

	A	B	C	D	E
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Sodium hydrate	65.9	82.8	71.6	87.0	85.2
" carbonate	4.75	5.3	3.18	3.7	3.18
" chloride	17.0	7.45	4.2	2.6	5.5
" sulphate	1.57	2.04	9.25	2.8	2.3
" silicate	0.58	0.33	0.4	0.13	0.55
Potassium sulphate	2.4	0.58	4.35	0.73	0.38
Water	7.0	3.4	6.4	4.7	2.4
Insoluble matter	0.21	none	0.17	trace	trace

Soluble impurities, present only in minute quantities in some of the samples, as alumina and lime, are not taken account of in the table.

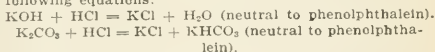
This is another instance which shows that the pharmacist should not rely merely on the appearance of his supplies of chemicals for their identity and quality, and again emphasizes the necessity of applying chemical tests, not only to detect intentional substitutions and adulterations, but also to discover such inadvertencies as may occur now and then, even in the most carefully conducted manufacturing and wholesale establishments. In most cases this can be done by very simple means.

Potassium and sodium compounds can be readily distinguished by means of the familiar flame-test. This requires simply a few inches of platinum wire, for which clean iron wire may be substituted, if necessary, and a non-luminous gas flame. A fragment of a pure potassium compound, taken upon a loop of platinum wire and held in a non-luminous flame, colors the latter a pure violet, without a tinge of yellow, (which would indicate the presence of sodium). Sodium compounds color the flame intensely yellow. Crude potashes always contain small quantities of soda, but when it is not sufficient to cover entirely the violet of the potassium flame, it is not objectionable for purposes that do not require purified potash. When no violet is visible in the flame, the sample may still consist largely of potash or it may be principally soda, and, when viewed through a plate of blue glass, it can be seen whether potash is present in small or large quantity, by the intensity of color visible through the glass, through which the yellow does not penetrate. It must be kept in mind, however, that the intensity of the potassium flame varies, not only with the proportion of potash in the sample, but also with the quantity taken for the test and the heat of the flame.

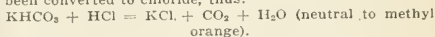
Accurate quantitative estimations of potassium and sodium, in presence of each other, can be made only by methods requiring considerable time and attention, but sufficiently exact results for ordinary purposes may be obtained by methods that are at the command of the prac-

ticing pharmacist. The one based on the insolubility of potassium bitartrate in mixtures of alcohol and water is, perhaps, the most convenient and satisfactory, when great precision is not required. This is the method directed by the U. S. P., of 1890 for the determination of soda in potash. The sample, dissolved in a small quantity of water, is accurately neutralized with a concentrated solution of tartaric acid, with phenolphthalein as indicator. Litmus does not answer, as normal alkali tartrates are alkaline towards it. Exactly the same volume as was required for neutralization is then added to the solution to convert the tartrates into bitartrate of potassium, which is precipitated almost completely, owing to its sparing solubility, and bitartrate of sodium, which remains in solution. By the addition of alcohol the precipitation of potassium bitartrate is made complete. The precipitate is collected on a filter and washed with alcohol until a drop of the washings no longer reddens blue, or preferably neutral, litmus paper previously moistened with distilled water. The filtrate is titrated with decinormal potassium or sodium hydrate, each cubic centimeter corresponding to 0.004 gramme of sodium hydrate. The precipitate of potassium bitartrate on the filter is transferred to a beaker, water added, and then volumetric alkali until neutralized, with phenolphthalein as indicator. Heating the mixture hastens solution of the bitartrate. Each cubic centimeter of normal alkali required indicates 0.056 gramme of potassium hydrate. If preferred, the precipitate may be dried and weighed, and the weight obtained multiplied by 0.3, which gives the potassium present in the sample as potassium hydrate.

The actual amount of caustic and carbonated alkali must be determined by titration with sulphuric or hydrochloric acid. The fact is frequently overlooked that in titrating caustic alkalies in presence of phenolphthalein in the cold, one-half of the carbonate present is also included and calculated as hydrate. This is due to the fact that the bicarbonates of potassium and sodium are neutral to phenolphthalein. When the solution is sufficiently dilute, practically no carbon dioxide will have escaped when the neutral point is reached and all carbonate will have been converted into bicarbonate, as shown by the following equations:



If methyl orange be now added and the titration continued until the color changes, the bicarbonate will have been converted to chloride, thus:



The quantities of hydrate and carbonate are then calculated in the following manner: If, for example, 1.55 cc. of normal acid be required for the titration with phenolphthalein, and 0.55 cc. in addition, to render the solution neutral to methyl orange, then $15.5 - 0.55 = 15.15$ cc. is the volume required for the hydrate, and $0.55 \times 2 = 1.1$ cc. for the carbonate in the sample, each cubic centimeter corresponding to 0.056 gramme of potassium hydrate or 0.069 gramme of potassium carbonate.

The objection has been made to this method of titrating mixtures of alkali hydrates and carbonates, that it is untrustworthy because of loss of carbon dioxide during the titration with phenolphthalein. This loss can readily be avoided, as the writer has determined, by diluting the solution to 250 cc. for each gramme of sample, running in the volumetric acid slowly and stirring continuously and gently to the end of the titration.

Somewhat less care is required in this regard when an excess of barium chloride is added to the solution before titrating, to precipitate the carbonate present. In this case all of the volumetric solution required to render the solution neutral to phenolphthalein is calculated as hydrate. The precipitated carbonate may then be readily estimated by continuing the titration after addition of methyl orange, shaking thoroughly after each addition of acid. The barium chloride used must be neutral to both indicators used, and at least enough to precipitate all carbonate must be added.

Chloride is most conveniently estimated by supersaturating the sample with nitric acid, adding an excess of decinormal silver nitrate, and titrating the excess with decinormal sulphocyanate, with ferric alum as indicator.

* Report from Research Committee D, Section II., of the Committee of Revision of the U. S. Pharmacopoeia. (Am. Journ. of Pharmacy.)

Each cubic centimeter of the silver solution is equivalent to 0.00354 gramme of chlorine, or 0.00744 gramme of potassium chloride.

Sulphate is determined gravimetrically as barium sulphate, whenever great accuracy is necessary, but very serviceable results may be obtained by titration with barium chloride. The normal solution of the U. S. P. of 1890, containing 122 grammes of pure crystallized salt per liter, may be used. The sample is dissolved in dilute hydrochloric acid, avoiding a large excess, which retards precipitation of barium sulphate. After heating the solution to near boiling, the barium chloride solution is added a drop at a time, shaking after each addition, so long as each drop can be seen to cause a precipitate. Heating is then continued below boiling, until the precipitate settles, leaving the supernatant liquid clear. A drop of the solution is then added, the precipitate allowed to settle again, and this continued until no further precipitation takes place. If haste is necessary, a little of the supernatant solution, still containing some of the fine precipitate in suspension, may be poured out in two test tubes, a drop of barium solution added to one, and the difference in turbidity noted. If the precipitation is not complete, the contents of the tubes are returned and the procedure repeated as often as necessary. With a little practice, fairly correct results can in this way be obtained very quickly. Each cubic centimeter of normal barium chloride solution corresponds to 0.087 gramme of potassium sulphate.

To test potash for silica, the U. S. P. of 1890 gives the following directions: "If 1 gramme be dissolved in 2 c.c. of water and added to 10 c.c. of alcohol, not more than a slight colorless precipitate should occur within ten minutes (limit of silicate)." The same solution is then directed to be tested for carbonate, as follows: "After boiling this alcoholic solution with 5 c.c. of lime water and filtering, not the slightest effervescence should take place on adding the filtrate to an excess of dilute hydrochloric acid." Any sample containing an appreciable amount of carbonate will give a precipitate when tested as above for silica, although it may be free from the latter, since alkali carbonates are insoluble in alcohol. Potassium carbonate sometimes precipitates in alcohol in a flocculent form, and may then be mistaken for silica. The test for silicate and that for carbonate are thus both vitiated, as the greater part of the carbonate is removed from the solution before testing for it, and the sample can hardly fail to stand this second test. It would be preferable to perform the lime-water test for carbonate with an aqueous solution of the sample, or to test for it in the manner indicated in the preceding. The most reliable test for silica is probably the one based on the fact that it is rendered insoluble by evaporating to dryness with an excess of hydrochloric acid in a porcelain or platinum dish, and heating for a while at an elevated temperature. Upon cooling, then moistening the residue with strong hydrochloric acid, and, after letting stand a while, dissolving in hot water, the silica remains undissolved. For quantitative estimations it is filtered out, washed, ignited and weighed.

The best crude caustic potash available in the New York market at present is not greatly inferior in quality and strength to the standard set by the Pharmacopœia for the purified article, as the subjoined analysis of a sample recently examined will show. It can be obtained in drums containing 10 pounds, or in any larger quantity desired. It is in the form of a yellowish-white, coarse granular powder, and gives a nearly clear and colorless solution. The composition is as follows:

	Per cent.
Potassium hydrate	86.4
Sodium hydrate	1.8
Potassium carbonate	4.85
Potassium chloride	1.4
Potassium silicate	0.1
Water	5.55

A total absence of sulphate, as noted in this sample, is unusual in crude potash, and the chloride is seldom less than 2 per cent. Alumina and lime are practically absent.

The methods used in the examination of this sample and those discussed at the beginning of this paper, are essentially those recommended by Fresenius. Potassium was estimated by precipitation with platinum chloride, and in some cases the results were confirmed by weighing the mixed chlorides of potassium and sodium, and esti-

imating the chlorine in the mixture. Further corroboration of the absence of more than small quantities of potassium in some of the samples was obtained by the failure of precipitation with an excess of tartaric acid or with sodium cobaltic nitrite.

In this connection an experiment was made to determine the sensitiveness of the sodium cobaltic nitrite test. Pure potassium bicarbonate was supersaturated with acetic acid and diluted to definite volumes. On adding the test solution to a solution containing the equivalent of 0.3 per cent. of potassium hydrate, a turbidity began to appear in 1½ minutes. A 0.2 per cent. solution became faintly turbid in 4 minutes. Greater dilutions failed to react even after standing over night. To detect, for instance, 2 per cent. of potash in a sample of soda, the test would have to be applied to a solution containing at least 10 per cent. of the sample. Very rough quantitative estimations of potash may be made by diluting a solution of the sample to the point at which a reaction is barely visible within 4 minutes and assuming this dilution to contain 0.2 per cent. of potassium hydrate. Another way, suggested by Dr. Charles Rice, consists in precipitating the potassium cobaltic nitrite from a concentrated solution of the sample, collecting on counterpoised filters, drying and weighing, another sample, containing a known quantity of potassium, being treated in exactly the same manner, and the weights of the two precipitates compared. A large excess of reagent is required to obtain a maximum precipitation, enough to give the supernatant solution a dark brown color. The precipitate is appreciably soluble in water and should therefore not be over-washed. Both samples should be washed with the same quantity of water. As the composition of the precipitate is somewhat variable and the conditions governing the variability have not been determined, sodium cobaltic nitrite cannot at present be used for accurate estimations of potassium.

PHARMACY.

STERILIZATION OF POTABLE WATER WITH CHLORINE PEROXIDE has recently been proposed as a substitute for ozone, which is used for the same purpose. Chlorine peroxide, or dioxide (Cl O_2), is readily and cheaply prepared. It is a gas, which is soluble in water and is decomposed by daylight, as also by contact with organic substances. It is a very energetic oxidizing agent, 0.0003 Gm. being sufficient for the sterilization of a liter of water. With its powerful bactericidal properties chlorine peroxide is claimed to be entirely harmless to man, animals and the higher forms of plants. Fish and green water plants thrive in water saturated with the gas without injury. The gas is said also to favor alcoholic fermentation and at the same time to destroy parasitic growths. H. Bergé has constructed an apparatus in which the gas is generated from potassium chlorate and sulphuric acid automatically, requiring but little attention. The Südd. Ap. Ztg., in commenting on the above, draws attention to the fact that chlorine peroxide is one of the most explosive gases and requires great caution in its preparation. When dissolved in water it is decomposed into chloric and chlorous acids, neither of which can be considered indifferent in action toward the human body.

BEHAVIOR OF DIPHTHERIA ANTITOXIN TOWARD EXTERNAL INFLUENCES.—Dr. Felix Möller has conducted a series of experiments bearing on the action of light, air and several gases on anti-diphtheritic serum. He found that the serum has a considerable power of resistance against daylight and that of the several parts of the spectrum, yellow and red light decreases its antitoxic power much less than green and blue light. It was shown also, that the lighter or darker appearance of the serum is without influence on the degree of its activity. Exposed to daylight, the originally golden-yellow serum lost its color almost entirely in a few days, in a blue light after several weeks, and in a yellow light after a little longer time, while it was not bleached in a red or green light. There is no rela-

tion, therefore, between the color and the strength. Heat is much more injurious than light, and the serum should, therefore, be kept in a cool place. Oxygen has a very injurious influence, also atmospheric air, though in a less degree. Similar to air in effect are nitrogen, carbonic acid and hydrogen. (Ap. Ztg.).

ACETYLENE GAS FROM A HYGIENIC STAND-POINT.—The increasing use of acetylene as an illuminating gas and the objection made to it in some quarters on the score of hygienic considerations, lend particular interest to a number of experiments recently made on animals. Dogs were kept for some time in an atmosphere containing 20 per cent. of acetylene without deleterious effect, and it would appear that living beings are not injured by breathing an atmosphere so contaminated. A dog kept in an atmosphere containing 40 per cent. of acetylene, however, succumbed after breathing 110 liters of the mixture. The danger from acetylene is smaller than from ordinary illuminating gas, and its intense odor makes it readily noticed when escaping into the air. There is no risk of explosion until the air contains one-twelfth of its volume of acetylene. It is particularly adapted to illumination, because of the slight heating effect as compared with its illuminating power, and the removal of but little oxygen from the atmosphere. The heat of combustion with an acetylene flame does not rise above 900° C., while the heat from an ordinary gas flame may reach 1,300° C.

RECIPES FOR LIQUEURS.—*Crème d'absinthe.* 125 Gm. of wormwood flowers without stems and the rind of 3 fresh bitter oranges are macerated 24 hours with 1.5 kg. of alcohol and 1.5 kg. of water. The mixture is distilled and 2 kg. distillate collected, which is mixed with a solution of 1 kg. of sugar in 1 kg. of distilled water. The product is colored green. *Crème de Bergamotte.* (1) Alcohol, 2,000 p., oil of bergamot 5 p., sugar 1,500 p., water of orange peel 500 p., dist. water 1,000 p. Mix and color yellow. (2) Alcohol 2,000 p., oil of bergamot 5 p., sugar and dist. water, of each 1,500 p. *Liquor de Genévre.* Juniper berries 125 p., cassia buds 25 p., clove 15 p., and coriander 30 p., are macerated with 1,500 p. of alcohol and 2,000 p. of water, then 2,000 parts distilled from the mixture, the distillate mixed with a solution of 1,000 p. of sugar in 1,000 p. of distilled water, and colored green. *Crème de Menthe.* Fresh leaves of crisped mint (*Mentha crispa*) 200 Gm., peppermint leaves 2 kg., and the rind of 4 lemons are macerated 24 hours with 3 liters each of alcohol and water, and 4 liters distilled off. To the distillate a solution of 2 kg. of sugar in 2 kg. of distilled water is added, and the liqueur colored green. (Ap. Ztg.)

SUGAR GRANULES AS VEHICLES FOR MEDICINES are recommended in Schweitz. Woch. Ph. It is proposed to use granules of 1 mm. diameter, and to saturate these with the medicaments in a manner similar to the homeopathic granules, but with definite quantities of the active substance. The granules are placed in a dish having a round bottom, and a definite amount of the medicinal substance is added in alcoholic solution or in form of syrup. After thorough admixture the dish is set upon a waterbath and the contents evaporated to dryness, with constant stirring. The granules are kept in dry glass bottles. In this manner Kola granules may be prepared from 50 parts of alcoholic extract of Kola, 50 parts of diluted alcohol and 950 parts of granules. A teaspoonful of the product corresponds to 0.02 Gm. (3-10 grain) of extract. In a similar manner granular preparations of coca, cinchona, condurango, hydrastis, ipecac, etc., may be prepared. Even tar can be incorporated, dissolved in tincture of tolu. Insoluble salts, vegetable powders, aqueous extracts, etc., are mixed with 1 part of simple syrup for every 10 parts of granules before admixture. (Südd. Ap. Ztg.).

SOAP AS A DISINFECTANT.—The use of soaps containing a disinfectant of some kind has become so general that observations on the practical value of such combinations cannot fail to be of interest. Dr. Reithoffer (Med. Press.) has recently published the results of some experiments carried out by him with various kinds of soap, having for object to determine their value as mi-

crobicides. He used the ordinary mottled soap, white almond soap perfumed with nitrobenzene, and hard potash soap. He found that these soaps were very inimical to the cholera microbe, a 1 per cent. solution killing them in a short space of time, while a 5 per cent. solution of the potash soap killed them in five minutes. We are, therefore, at liberty to infer that, as in washing the hands the strength of the soap solution is never less than 5, and may go as high as 45 per cent., this method of disinfecting the hands, as well as the clothes, etc., is fairly trustworthy. Much stronger solutions are required, however, to destroy the bacilli of typhoid, the coli bacilli, etc., not less than 10 per cent. being sufficient. None of the soaps experimented with appeared to have any effect on the pyogenic microbe. The practical result of these investigations is that it is always preferable to use soap and water first of all, rinsing the hands in the disinfectant solution afterward. This is an important point, which merits to be generally made known.

EXAMINATION OF MILK FOR NITRATES.—10 Cc. of the milk are placed in a wide testtube and 2 drops of a 20 per cent. solution of calcium chloride added. After thorough shaking, the tube is placed in an oblique position in a waterbath, previously heated to 50° C., which is then brought to boiling. The contents of the tube are subjected to a boiling temperature for at least 10 minutes, and the clear serum is poured off. As reagent a solution is prepared of 20 mg. of diphenylamine in 20 Cc. of diluted sulphuric acid (1 vol. acid, 3 vol. water) and this made up to 100 Cc. with pure concentrated sulphuric acid.—2 Cc. of this diphenylamine solution are placed in a small, white porcelain capsule (or in a watchglass upon a sheet of white paper), 0.5 Cc. of the serum is then let fall in drops upon the centre of the reagent in the capsule and the mixture allowed to stand 2 or 3 minutes without mixing. In presence of nitrates a blue ring is formed, and when the capsule is moved to and fro, the entire liquid becomes more or less intensely blue, depending on the quantity of nitrate present. When the milk is free from nitrates, only a brownish spot is found in the centre of the liquid. The sulphuric acid should, of course, be absolutely free from oxides of nitrogen. The reaction is so sharp and sensitive, that a distinct indication of nitrate is obtained, when only as much water is present as is required for rinsing a milk pail, to prevent any loss of milk. Since the presence of such a small quantity of water is sufficient to produce the reaction, particular caution is necessary in forming a judgment as to the purity of milk based on this reaction. (Drog. Ztg.).

SAKI, THE JAPANESE NATURAL DRINK.—Prof. Dr. Loew, of the Munich Brewing Academy, who had abundant opportunity to become thoroughly acquainted with saki (the rice wine of the Japanese) during his four years' residence in Tokio as professor at the university of that city, recently made the liquor the subject of an interesting talk before the Munich Faculty, says the National Druggist. Saki, says the professor, has been used in Japan for upward of two thousand years. It is made from rice, the grain being first steamed, and then impregnated with a species of ferment. As soon as the impregnation has occurred, the rice is mixed in water and submitted to fermentation. The yeast used in the fermentation is prepared from rice straw, on which the steamed and impregnated rice is spread out before it is prepared for fermentation. Under the influence of the ferment and the yeast all of the starch of the rice is taken up, so that the product has the character of a wine, and is hence called "rice wine." It is a somewhat remarkable fact that for ages past the Japanese have used the identical process known with us as "pasteurizing," or exposing the saki, in closed vessels, to a certain degree of heat, to give it a keeping quality, which it otherwise does not possess. Saki, when ready for use, contains from 14 per cent. to 14 per cent. of alcohol, or is about five times as strong as our beer. The latter, however, is forging its way into the land, and in all the breweries that have been established there beer is made after the German method. This seems to be in spite of the fact that Japan has, in the main, adopted the English and American culture, rather than the German.

THE VALUE OF FRESH AIR.—The admitted advantage of an outdoor life in many morbid conditions, and notably in consumption, seems to point to the conclusion that there is something definitely injurious in the indoor life which is now the common mode of existence among civilized people. It is a striking and startling thing that the mere removal of a patient into the open air should lower his fever, should remove his night sweats, and take away his hectic flush, and it is difficult to avoid the conclusion that if these symptoms are removed by the purity of the air outside, they must have been largely caused by the impurity of the air within the house. Nor have we any right to assume that it is the consumptive only who suffers. Doubtless the healthy struggle against and overcome evil influences, before which those who are tuberculous succumb, but that is not to say that in the struggle we do not suffer, and, indeed, the facts recently brought forward are sufficient to show that the stuffy life of warmth and comfort which civilized man now "enjoys" is bad for the health, even of the healthiest. We make our windows fit, we pad our doors, we shiver at a draught, we surround ourselves with woollen curtains, dusty carpets and fluffy, luxurious upholstery; we breathe the same air over and over again, and then we wonder that we are not strong and vigorous. The fact is, we are daily using up the exuberant vitality with which nature has provided us in struggling against artificial conditions. How powerful for evil, how deteriorating these conditions are, is shown by the fact that their mere removal gives back to the consumptive that vitality which enables him to overcome the seeds of disease within him. Fresh air is not a thing to be taken in little doses once a day, but a thing to live on.—London Hospital (Sci. Am.).

AN ENDLESS SOURCE OF CARBONIC ACID.—Prof. E. W. Clapote's address at the last meeting of the American Microscopical Society—"Microscopical Light in Geological Darkness"—concerns the aid furnished by the microscope in geological study. Among the revelations afforded by means of this instrument is that which it has yielded, in the hands of H. C. Sorby, of Sheffield, England, of the existence of innumerable inclusions of liquid carbonic acid in the rocks. As investigation has gone on, the abundance of these bubbles has been more and more realized, and they are now found to be present "by myriads and by millions, and not in gems only, but in other crystalline minerals. In size they range between the one-thousandth and the fifty-thousandth of an inch, but they are so multitudinous as often to impart a white tint to the crystal, and many specimens of milky quartz owe their whiteness solely to the presence of these innumerable bubbles. In some of the Cornish granites the cavities make 5 per cent. of the volume, and yield four pounds of the liquid to every ton of the rock." J. C. Ward is quoted as saying that more than a thousand millions of them might be contained easily within a cubic inch of quartz. The fact is used to cast light on the problem of the origin of the coal. Coal is derived from plants, which have extracted carbon from the carbonic acid of the atmosphere. Whence was that carbonic acid derived? It has been said that it was one of the original constituents of the atmosphere. But Prof. Clapote adduces many reasons to show that all the carbonic acid represented in the coal beds could never have been in the atmosphere at one time. How then, and whence, were the successive supplies introduced? Besides Mr. Sorby's experiments, those of Prof. Tilden and others show that rocks of various kinds and in various localities yield gases, of which hydrogen and carbonic acid are the most abundant, in proportions ranging from 1.3 to 17.8 of the bulk of the rock, whence it may be inferred that these gases are included in most rocks. Now, immense volumes of the primary rocks have been worn away by the action of water, and have furnished the material from which the sedimentary rocks are derived. This washing away has involved the breaking open of the minute reservoirs of carbonic acid, and it has gone into the atmosphere, not all at once, but gradually, so as to furnish a continuous, not excessive, supply. A brief calculation presented by Prof. Clapote makes it evident that the rocks would thus furnish an abundant supply, and to spare, for all the coal that is known to exist. (Pop. Sci. Monthly.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Queries from Non-Subscribers Not Answered.

(H. L. Clark.) Riverside, Ca., and (William Tyerman) Meadville, Pa., should read the rules at the head of this department. Queries from non-subscribers are not answered.

Masking Odor of Asnfeldia.

(Excelsior.) See this journal, April 28, 1898, page 601.

Manufacturers of Music Boxes.

(R. W. S.) Regina Music Box Co., No. 425 West Fifteenth street, this city, manufactures American music boxes.

Sample of Saltpeter.

(H. L. S.) The sample of saltpetre you submit is a good commercial article in powdered form. We fail to recognize the chlorine "odor" you describe.

Salt of Steel.

(E. W. E.) "Salt of steel" is an old synonym for sulphate of iron, and as such it was officially noted in the earlier editions of both the London and Edinburgh Pharmacopoeias. Other synonyms were sal martis, vitriolum martis seu sal chalybis, vitriol of iron, etc.

Pheno-Bromate.

(E. W. E.) "Pheno-Bromate" is manufactured by the Pheno-Bromate Chemical Company, No. 38 Murray street, this city, and said by them to be "an antipyretic, analgesic and cardiac stimulant." It may be obtained in both powder and tablet form.

Ink for Stylographic Pens.

(Student.)

Indigo carmine	1 dram
Gum acacia, powdered	2 1/2 drams
Tannic acid	320 grains
Pyrogallie acid	10 grains
Ferrous sulphate	220 grains
Carbolic acid	1 dram
Syrup	1 1/2 drams
Distilled water	20 fl. ounces

Pennsylvania Pharmaceutical Examining Board.

(J. B. C.) The Pennsylvania State Pharmaceutical Board is composed of Louis Emanuel, Pittsburg, president; Charles T. George, Harrisburg, secretary; Henry C. Porter, Towanda, treasurer; Edward A. Cornell, Williamsport, and Felix A. Boerleke, M. D., Philadelphia. The board usually holds four regular meetings (quarterly) each year.

Crystalline.

(S. E. M.) Crystalline is a kind of collodion, in which the ether and alcohol, employed as solvents for pyroxilin, are replaced by methyl alcohol. It is said to differ from collodion in that the solvent evaporates more slowly, and in forming a transparent film, which allows the part it protects to be seen, and the progress of the treatment followed. An elastic crystalline can be obtained by adding 20 grams crystalline to 5 grams castor oil and 10 grams Canada turpentine. Crystalline dissolves pyrogallie and salicylic acids, chrysarobin and many other medicaments. A modified formula, proposed by Thibault, is—

Pyroxilin	1 part
Methyl alcohol	4 parts
Amyl acetate	15 parts

Essence of Pancreas.

(O. W. D.) A so-called essence of pancreas may be prepared by treating the pancreas of the hog with dilute alcohol for about a week, then filtering. This preparation is said to possess the properties of the pancreatic juice, when not in an acid medium. A more elegant preparation may be made directly from pancreatin (U. S. P.) after formula No. 232, National Formulary. Here is another formula:

Pancreatin, pure	128 grains
Sodium bicarbonate	16 grains
Water	2 fl. ounces
Glycerine	2 fl. ounces
Simple elixir, enough to make.....	16 fl. ounces

Macerate the pancreatin in the water for 24 hours, add the sodium bicarbonate, triturate until dissolved, gradually add the elixir and filter.

Quinine Pessaries.

(T. C. C. G., Pretoria.) Pessaries are in reality very large suppositories for urethral medication, and almost any basis suitable for making the ordinary suppositories will answer for pessaries. Cacao butter is the preferable basis, though the following gelatine compound will answer very well:

Finest gelatine	1 ounce
Distilled water	1 ounce
Glycerine	3½ ounces

Soak the gelatine in the water, and when soft add the glycerine and dissolve by the heat of the water bath. Each pessary should weigh one or two drams, and contain from two to five grains of quinine hydrochlorate.

Another method is to dissolve the pure alkaloid, quinine in the cacao butter, or dissolve it in a little anhydrous ether, and add the solution to the warm, fatty basis, stirring to drive off the ether and until sufficiently cool to pour into moulds. The same rules governing the manufacture of suppositories are applicable to pessaries. We cannot give the formula for the proprietary preparation.

Tomato Ketchup.

(J. G. M.) We cannot give the formula for the proprietary preparation used for flavoring ketchup. Spices of various kinds are employed for this purpose, as the following formulas show:

- (1) **Ripe tomatoes** 6 quarts

Brulse and set in an oven with 1½ lb. of salt and a quart of water. At the end of an hour pour off a gallon of juice, and to this add

Shallots (peeled and sliced).....	4 ounces
Black pepper (bruised).....	½ ounce
Mace (bruised).....	½ ounce
Pimento (bruised).....	½ ounce
Ginger (bruised).....	½ ounce
Nutmeg (bruised).....	½ ounce
Cochineal (in coarse powder).....	2 drams
Cayenne pepper (in coarse powder).....	1 dram
Brown vinegar	1 pint

Simmer gently for half an hour, strain and bottle.

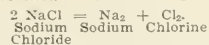
- (2) **Ripe tomatoes** 3 dozen
Chillie vinegar 1 pint
Garlic 1 ounce
Shallots 2 ounces
Common salt 2 ounces
Cayenne pepper ½ dram
Lemon juice 5 ounces

Put the tomatoes into a jar and warm in an oven until tender. Cool, skin, and pulp the fruit, and add to the liquor in the jar, along with the rest of the ingredients. Mix well and bottle.

Production of Chlorine by Electrolysis.

(W. D.) For the electrolytic production of potassium chlorate, see this journal Dec. 1, 1894, page 489. Regarding the various electrolytic methods of producing chlorine you will do well to consult the Journal of the Society of Chemical Industry (London) covering the past five years, a file of which may probably found in your city library (Ottawa, Ont.). Regarding the decomposition of sodium chloride with the production of chlorine and sodium hydrate we give in abstract Sadtler's description of the present three forms of this method in operation: When anodes and cathodes are placed opposite each other in a solution of sodium chloride, but with-

our being separated by a porous diaphragm, the electric current gives rise to the formation of hypochlorite of sodium. But if porous diaphragms are placed between the positive and negative plates in such a way as to form watertight compartments, chlorine will be generated in all the positive compartments and sodium in all the negative ones. The reaction is as follows:



The chlorine is used in making bleaching powder: the sodium reacts with the water present and forms sodium hydrate. One of these processes is that of Richardson and Holland, in which use is made of one non-porous partition which does not quite reach to the bottom of the tank, so that the solutions are not separated from each other at the bottom of the electrolyzer. It is said that there is some loss of chlorine by this method, due to formation of hypochlorite.

In the Castner process the diaphragm consists simply of a layer of mercury, which constantly oscillates in a compartment closed on each side by a non-porous partition, the lower end of which just reaches the layer of mercury. No resistance is offered by this diaphragm, which in consequence of a slow rocking of the tank leans first towards the cathode and then towards the anode, and which in coming alternately in contact first with one and then with the other absorbs the sodium liberated, and then at once gives it up to the water which is over the mercury. There seems to be an entire absence of hypochlorite formation in this process.

The other process is that of Hargreaves, in which a porous diaphragm is used on either side of the positive compartment, within which the electrolyte is placed, while the negative compartments to either side are empty at first. When the current passes, the chlorine is evolved in the positive compartment, while caustic soda oozes through the diaphragm to either side, and is swept off the outside of the same by a current of steam and rapidly converted into sodium carbonate. Potassium chloride is also electrolyzed, yielding as a by-product caustic potash, which is of higher value than caustic soda and of which a larger quantity is obtained for the same amount of current expended.

Cheep Cologne.

(C. M. B.) Here are several formulas from the Era Formulary and elsewhere:

- | | |
|---------------------------------|---------------|
| (1) Oil of bergamot | 1 ounce |
| Oil of lemon | 2 ounces |
| Oil of orange | 2 ounces |
| Oil of rosemary | 1 ounce |
| Oil of neroli | 2 drams |
| Oil of rose geranium | 4 drams |
| Oil of cloves | 2 drams |
| Extract of musk | 1 ounce |
| Orange flower water | 1 pint |
| Alcohol | 1 gallon |
| (2) Oil of clove | 10 minims |
| Oil of cassia | 5 minims |
| Oil of rose | 15 minims |
| Oil of rosemary | 30 minims |
| Oil of lemon | 4 fl. drams |
| Oil of bergamot | 2 fl. drams |
| Oil of lavender | 4 fl. drams |
| Oil of neroli | 2 fl. drams |
| Tincture benzoin | 1 ounce |
| Powdered Florentine orris | 6 pints |
| Cologne spirit | 1 pint |
| Rose water | 1 pint |
| Distilled water | 1 pint |
| Macerate one month and filter. | |
| (3) Oil of bergamot | 2 drams |
| Oil of lemon | 1 dram |
| Oil of neroli, big | 20 drops |
| Oil origanum flowers | 20 drops |
| Oil rosemary flowers | 20 drops |
| Cologne spirit | 1 pint |
| Orange flower water | 1 ounce |
| (4) Oil of bergamot | 4 fl. drams |
| Oil of lemon | 2 fl. drams |
| Oil of orange | 2 fl. drams |
| Oil of lavender | 1½ fl. drams |
| Oil of neroli | ½ fl. dram |
| Oil of rosemary | 15 drops |
| Oil of cloves | 8 drops |
| Tincture of musk | 1 fl. dram |
| Alcohol | 64 fl. ounces |
| (5) Oil of bergamot | 6 fl. drams |
| Oil of lemon | 3 fl. drams |
| Oil of lavender | 1 fl. dram |
| Oil of orange | 1 fl. dram |
| Oil of rose | 1 fl. dram |
| Tincture of musk | 2 fl. drams |
| Alcohol | 64 fl. ounces |

Tincture of Colocynth.

(S. E. L.) A tincture of colocynth is official in the Pharmacopœia Germanica. It is made by macerating for eight days one part of colocynth fruit, with the seeds, with 10 parts of alcohol (sp. gr. 0.832), expressing, and filtering. It is of a yellowish color, very bitter, and becomes opalescent upon the addition of water. The largest single dose is placed at 1.0 gram.

Hager (Manual) gives the following formula for:

Tincture of Colocynth Seed.
(Rademacher).

Colocynth seed 5 parts
Wash with water, dry and reduce to coarse powder; add
Rectified spirit 24 parts
Allow to stand (macerate) four days, frequently shaking. Then express and filter, adding enough alcohol to make the tincture up to 22 parts.

The American Homeopathic Pharmacopœia gives this formula: The dried fruit, freed from the outer yellow rind and seeds, is reduced to a coarse powder and weighed. Then five parts by weight of alcohol are poured upon it, and having been put into a well stoppered bottle, the mixture is allowed to remain eight days in a dark, cool place, being shaken twice a day. The tincture is then poured off, strained, and filtered. The "drug power" of this tincture is said to be "1-10," from which "dilutions" may be prepared as directed by the pharmacopœia.

Metal for Identification Checks (Metallic Alloys).

(C. E. M.) wants a metal the composition of which is such that it will not change by long contact with water and will stand a high degree of heat (2,500° to 3,000°) before melting. It must be capable of being formed into sheets and worked with a stamping machine into shape to receive the impression of a steel die sinker. It must also be reasonable in price. German silver or nickel would answer, but their melting points are too low. Platinum is all right, but it is too expensive.

We are afraid that C. E. M. will have considerable difficulty in obtaining a metal or alloy which will stand all the requirements he outlines. The list of metals which have melting points above 2,000° F. is not a long one, platinum heading the list at 4,712°. Then come nickel at 2,912°, wrought iron 2,786°, steel 2,552°, gold 2,485.5°, etc. Several other metals might be included in this list, but the high cost of production necessarily rules them out. It is possible that if some means could be devised for plating wrought iron or steel with a coating of some non-oxidizable substance, the object sought could be at least partially attained. However, such a problem must be worked out by experiment.

Alloys of various kinds have been suggested for this kind of service, and while it may not be possible to obtain a composition which will stand the high degree of heat named by our correspondent, yet it is possible that an alloy may be obtained which will have a melting point high enough for all practical purposes. A consideration of this aspect of the question prompts us to offer the following processes:

Improved Metallic Alloy.

Fifty parts of copper, 40 parts of zinc, and aluminum in the proportion of two and a half per cent. of the whole are taken. This is one example, but others may be obtained by varying the amounts of copper and zinc to the same proportion of aluminum. The mode of preparation of the alloy varies: For a hard metal the copper and aluminum are first mixed to form a copper alloy and the zinc added in small pieces during continuous agitation of the molten mass. This gives a reddish alloy that takes a high polish. For a ductile metal the zinc and aluminum are first mixed and the copper then added. This gives an alloy resembling brass. In both cases the metal is claimed to be non-oxidizable, proof against sea water, and, to a large extent, against acids. (Jour. Soc. Chem. Ind.)

Aluminum Bronze.

Aluminum bronze is an alloy of 90 to 95 per cent. of aluminum and 5 to 10 per cent. of copper, of golden color, which keeps well in the air, without soon becoming dull and changing the color, like pure copper and its alloys with tin and zinc (bronze, brass). It can be cast excellently and can be filed well and turned, possesses an

extraordinary hardness and firmness, and attains a high degree of polish; it is malleable and forgable. On the latter qualities are founded applications which were originally never thought of, viz., forged works of art for decorative purposes. An alloy of 95 parts aluminum and 5 parts copper is used here. The technical working of bronze is not materially different from that of iron. The metal is, especially in a warm condition, worked like iron on the anvil, with hammer and chisel, only that the temperature to be maintained in forging lies between dark and light cherry red. If the bronze could also be welded like iron, the artist forger would indeed have an ideal material, but that is not possible. If the articles are not forged in one piece, and the putting together of separate parts becomes necessary, riveting, and, above all, soldering, has to be resorted to, which can be done with soft or hard solder. Besides forging, the bronze is well suited for embossing, which is not surprising, considering the high percentage of copper. After finishing the pieces, the metal can be toned in manifold ways by treatment with acid. Jour. der Goldschmiedekunst; Sci. Am.)

PERHAPS?

"Marking down" goods below their usual price undoubtedly stimulates trade and causes people to buy more than they otherwise would. The deepest philosophy is unable to withstand the temptation of a bargain. A thing may not be needed when it happens to be quoted at a tempting figure, but the unhappy customer is prey to the harrowing doubt that perhaps the article will never again be offered at a cut price, and with this fear as an incentive, the purchase is made. After an article bought under such circumstances is once in possession there is a disposition to use it, and perhaps to cast off old articles before they are quite worn out, thus increasing the consumption of goods.

This feature of "marking down" goods is most noticeable in the personal apparel and household supply lines, but the same principle applies to a greater or less extent to drugs. It is quite useless to controvert the settled idea that drugs, like coffins, are only bought when needed, but at the same time it might be remarked that drugs are more often needed when they are cheap, that is to say, a man will endure a headache if the cure costs fifty cents, but if the cure costs but 35 cents he may conclude that relief is more attractive than money. In this case we may say that he "needs" the medicine because it is cheap. As another illustration, when quinine was worth ten acres of wheat or a drove of hogs per ounce and was carefully measured out by pioneers who needed it badly in the days of "fever'n ager," the consumption was limited by the cost and the drug was only taken by the most desperate cases. To-day the descendants of these pioneers, with a more fashionable but less prevalent "malaria," take quinine for minor ills or as a prophylactic, because they have it in the house, and they have it in the house because they can buy an original package of 100 pills for perhaps 19 cents. It would surely be folly to suffer, with quinine so handy and so cheap.

It seems to be a difficult task for most people to get the right perspective on fractional parts of a dollar. This explains why people are caught with prices in odd numbers. Forty-seven cents is but little less than half a dollar or fifty cents, but it seems and sounds like a great deal less. When we pay 47 we get 3 cents back, and there are possibilities in these three pennies. A mail order genius has figured out from his experience that about 100 people will buy a 25-cent article, where 500 will buy a 10-cent article, and one of the dear public has made confession, based upon experience and extended observation, that two bottles of patent medicine will sell at 47 cents each, where but one would sell at 50 cents. There are no statistics bearing upon drug consumption which settle definitely this question of increased sales through cheapness, but perhaps this explains the apparent prosperity of so many cutters.

ICHTHYOL FOR CORYZA.—The following is recommended for spraying into the nostrils: Ichthyol 1 part, ether 1 part, alcohol 1 part, and water 97 parts. (Südd. Ap. Ztg.)

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission

Vol. XX.

NEW YORK, OCTOBER 20, 1898.

No. 16.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL..... 511	New Rulings on the Medi-
CORRESPONDENCE..... 513	cine Tax; Lamman &
ERA COURSE IN PHAR-	Kemp Have a New
MACY..... 515	Home; From South Caro-
Inorganic Chemistry..... 516	lina; Punished for Coun-
Pharmaceutical Physics..... 517	ter- Prescribing; New
Official Preparations..... 520	York Bowlers in Action.. 545
Pharmaceutical Latin..... 522	NEWS LETTERS..... 546
Final Examinations..... 523	BUSINESS RECORD..... 552
QUESTION BOX..... 524	Kings County Society
PROCEEDINGS of the	Meeting; Pharmacy Law
National Wholesale Drug-	in New York City Is
gists' Association, the	Being Enforced..... 553
Proprietary Association	Paint, Oil and Varnish
of America, and the Na-	Association; Colleges of
tional Retail Druggists'	Pharmacy..... 554
Association, St. Louis,	OBITUARY..... 555
October 17-22..... 527	STATE OF TRADE..... 555
NEWS AND TRADE DE-	MARKET REPORT..... 556
PARTMENT..... 545	

SPECIAL SUBSCRIPTION OFFER.

At no time within the history of the drug trade have there been so many important events transpiring and likely to occur as at the present time. Questions are being discussed which vitally affect the well-being of the trade. Now, if ever, the druggist needs to keep in closest touch with events which concern him, and no agency so well fulfills this purpose as the pharmaceutical journal which is issued frequently enough to give him news when it is news, and to inform him of occurrences and anticipated events early enough for him to profit from them. Such a journal is the Pharmaceutical Era, and its advantage in being issued weekly is shared by no other pharmaceutical publication. Readers of the Era do not have to wait a fortnight or month for important news of the trade. The subscription price is \$3 per year (fifty-two numbers), but in order to enlist the interest of those who are not at present subscribers, the remaining issues of this year will be given free, and the year's subscription dated from January 1st to December 31st, 1899. By promptly remitting \$3 the subscriber will thus receive sixty-two numbers for the price of fifty-two. Address D. O. Haynes & Co., Publishers, Box 1483, New York.

The successful organization of a National Association of Retail Druggists at St. Louis, this week, was a disappointment to those who had hoped that the delegates would meet, resolve and adjourn, and leave the retail drug trade in the same unorganized condition which has hitherto rendered it helpless to all who might attack it, or else unite in the formation of an organization of such an impracticable nature that it would fall to pieces as quickly as it was put together. It also afforded an agreeable surprise for those who, while desiring the contrary, feared that the convention would deal mainly in expletives and dissolve in vapor.

While some features of the new organization might be criticised, there is much more to commend. The outcome of the meeting goes to justify the faith of those who have held, against much discouragement, that there is a latent potentiality among retail pharmacists, which, if it can be set in motion and properly directed, must prove a powerful factor in the improvement of present trade conditions.

The attendance of delegates was large and representative of the best and most forceful men in the retail trade. The anarchists and dynamiters were kept within reasonable bounds, and the discussions conducted generally in an orderly, sensible, business-like manner, leaving the impression that the organizers of the movement had a definite conception of the problems confronting them, and of the best methods of solution. The plans of the new society are framed generally upon broad and liberal lines, while the officers who have been selected to guide it during the first years of its existence are strong, intelligent and independent. The auguries are favorable; it is to be hoped that the results will be satisfactory.

The greatest danger to the success of the plan is the fact that some of its most enthusiastic supporters are apparently expecting it to accomplish much that lies beyond the sphere of the possible, and their disappointment may lead them to withhold from the new organization that hearty support which is absolutely essential to its prosperity. Trade organizations have a large and important, but nevertheless a definitely, circumscribed, field of usefulness. They cannot compel the current of trade to run up, nor nullify the law of supply and demand. If those who are responsible for the future policy of the N. A. R. D. fully realize the importance of these facts, and are content to work in harmony with them, the new organization will have a greater opportunity for securing substantial improvement in the conditions of the retail drug trade than any precedent or existing organization.

Of its possible opportunities for good we may name the following:

It can, and doubtless will, serve as a sort of clearing house for the grievances of all branches of the drug trade, retail, wholesale and proprietary, where balances can be struck and trade difficulties receive formal adjustment.

Being a delegate body, it is more likely to be composed at all times of brainy, well-balanced men than a voluntary organization, practically open to every applicant for membership who tenders the requisite initiation fee.

This feature of its constitution also enables it to represent a much larger number of druggists and to exercise a proportionately greater influence upon those with whom it must deal, than can be done by an association based upon the plan of personal membership. An association of the latter kind represents only itself and its members; a delegate body may represent the nation, or, if need be, the continent.

Some of the now enthusiastic members apparently expect that the N. A. R. D. will be able to permanently and completely solve the price-cutting problem, and shall be very much disappointed if it does not. Those who can see no more important work than this for the new society have misconceived its proper functions. The business of the association is with the conditions which have produced the cutter. With the latter it can deal only by indirection. Price-cutting, by the retailer, is largely a result of local conditions, and must receive local treatment. The association can compel only where it can punish. It cannot punish the retailer who defies its authority, and hence it cannot regulate the price at which he shall sell his goods.

Indirectly, however, the new association can, and no doubt will, favorably affect the maintenance of prices, by contracting and making more difficult the sources through which the cutter and department stores receive their supplies.

As regards the manufacturer and jobber, the association is more favorably situated. These it can either reward or punish, and consequently can compel them to afford the retailer fair treatment.

If we have a proper grasp of the situation, however, the greatest opportunity of this new member in the family of pharmaceutical associations lies in the fact that it can act as the recognized head and mouth-piece of the entire drug trade, that it presents something tangible to tie to, an entity which can negotiate and contract with the manufacturer and jobber, and which can best reward those who conscientiously discharge their obligations to the retail trade and exact a penalty from those who ignore such obligations. The American Pharmaceutical Association cannot properly discharge such a function, and wisely declined to attempt it. The State and smaller organizations are equally, or even more helpless in this matter. Here is the great opportunity of the association which has just been put into operation.

The Truth About the Druggists' League for Shorter Hours.

The "Druggists' League for Shorter Hours" of New York city was organized in March, 1897, and designed by its founders to "modify the hours of labor of those engaged in the retail drug business within the territory designated in the charter of the Greater New York." Its agitation through the winter of 1897-8 resulted in the passage by the State Legislature of an act limiting the working time of drug clerks to sixty-six hours a week. That act did not become a law because it was sent to the Governor from the mayor with the latter's condemnation—the mayor having the final word regarding such measures affecting only New York city.

Now the Druggists' League is again agitating for a shorter hour law, and the manner of its agitation, as it was last winter, is again obnoxious to the majority of those engaged in the drug trade, and decidedly distasteful to the best element of that trade.

The league employs a press agent. He advertises it as conducting "a crusade." This consists in the publication in the daily newspapers of communications filled with vituperation, calumny, abuse and defamation. Within the past month the League's press agent, in these letters of his to the public prints, has cast aspersions on pretty nearly everybody connected in any way with the drug trade. He has libeled pharmacists as a class, hurled defamation at druggists as proprietors, branded drug clerks as consummate rascals, and attacked the Board of Pharmacy, charging incompetence, indolence, and neglect of its duties. Of course he assumes to back up his allegations with citations of facts. But his facts are ever the most wilful misrepresentations and distortions. Repeatedly this journal has investigated the charges and the statements made by this man, with the sanction of the Druggists' League; and repeatedly it has found them to be without a tissue of truth. Therein lies the misfortune, for the people who read the animadversions and diatribes from the league in the newspapers do not know that the statements are malignant perversions of the truth.

Some additional facts about the league and its leading lights known to this journal and sworn to by a cloud of witnesses, are interesting. The league's vice-president has admitted violating the pharmacy laws by permitting an unregistered clerk in his employ to compound prescriptions. A druggist-legislator of New York city, who voted for the shorter hour bill last year and who announces himself again as favoring such an act, works one clerk in his employ from 7 a. m. to 11 p. m. and another from 8 a. m. to 12 midnight. Such is his practice, yet he preaches shorter hours in order that the salaries paid to drug clerks may be lowered. The one cannot come without the other.

How many drug clerks are willing to pay the price of reduced salaries for a shorter hour law? How many of the clerks in New York city are honestly in favor of the league's agitation and purpose? Let us see. The league has never shown its membership book. It has claimed a membership of 620. Now there are in New York city over 3,000 registered pharmacists who are actively engaged in the retail drug business. Two-thirds of that number are clerks. In addition there are at least 1,000 drug clerks employed in the city who are not registered pharmacists. Taking 620, the highest number claimed by the Druggists' League, from 4,000, we have 3,380—druggists and drug clerks who are not in favor of the league and its projects. Furthermore, in that 620 claimed the league counts scores of pharmacists who were induced to join its ranks at the start, before its bill was formulated or its senseless agitation and vilification were begun, and who have since repudiated the league and all that is connected with it.

The great majority of persons identified with the retail drug trade in New York city, drug clerks and their employers alike, do not want a shorter hours law. They do not want it because they believe (and rightly) that specious, class legislation is not the remedy for whatever ills may exist. But there is a danger that such a law may be forced down their throats in spite of their protests. The danger consists in the political influence indirectly wielded by the Druggists' League. The league has allied itself with the labor unions, and the labor unions are capable of inspiring the petty politicians of the State Legislature with a large, quaking fear. Since these things be, the passage of another shorter hours bill may be confidently predicted—as it is predicted to-day by the Druggists' League.

It behooves every one of those 3,380 druggists who

are opposed to such an act of legislation to keep awake, to watch and pray, and to be ready to fight when fighting shall become necessary.

Era Course in Pharmacy.

There may be some to whom this issue of the Era may come who are not familiar with the nature and purpose of the Era Course in Pharmacy. This course of home study is a modification of the Chautauquan or university extension system of teaching by correspondence, especially adapted to the requirements of students of pharmacy, and designed to afford a systematic, thorough and comprehensive education to those who are debarred by circumstances from attending a regular college of pharmacy. It is a course covering two years of nine months each; conducted by the publication of lectures in this journal and recitations and examinations thereon by correspondence direct with the individual students. The success of this course last year was phenomenal, and the present year has opened with a most gratifying enrollment in both junior and senior classes. The work has been under way for a short time, and the students have evinced an earnestness and application in study which is abundant testimony that they appreciate in highest degree the opportunity afforded them by this course to secure a sound, practical education at little cost and but slight inconvenience. The character of the course is set forth in more detail in the advertisement published elsewhere in this issue.

We earnestly urge all who desire to avail themselves of this opportunity to secure a pharmaceutical education, and those who have delayed matriculation, to send in their applications at once, in order that the classes may be kept well together in their work, and the student be not discouraged by having an undue amount of back work to make up. We should be pleased to more fully inform any inquirer upon request, and earnestly commend the work to all those young men and women who must study pharmacy at home, if at all, in fitting themselves for their chosen vocation.

CASANTHROL is the name given by Unna to a mixture of casein ointment with 10 per cent. of the ether and benzol-soluble constituents of coal tar. It belongs to the group of so-called water soluble varnishes and is a thick and tenacious emulsion, from which no fat separates even on warming. Upon the skin it forms after a few minutes a dry, elastic covering, which, however, does not hinder the perspiration, but rather tends to increase it. It has a neutral reaction, and may be mixed with any substance that does not coagulate casein, and can therefore be mixed only with small quantities of mineral and acid salts, not exceeding 1 per cent. Dr. S. Beck recommends casanthrol in eczemas of children, prurigo, etc., where it causes no unpleasant secondary effects. It is the only preparation that can be used in strong concentration (10 per cent.) on the inflamed skin to advantage. (Ph. Post.)

BISMUTHOXYIODIDE-OXYPYRROGALLATE is prepared by digesting molecular quantities of bismuth oxyiodide and oxypyrrgallol, as also by precipitating a solution of oxypyrrgallol and an iodide by adding a solution of bismuth nitrate in acetic acid. It is a brown powder, permanent in air and light, and insoluble in the ordinary solvents. It has valuable antiseptic properties and is free from poisonous effects. (Südd. Ap. Ztg.)

AMYLENE-CHLORAL is a colorless, oily fluid of a peculiar odor resembling that of camphor, and a burning taste. Its sp. gravity is 1.24. It is insoluble in cold water, soluble in hot water after prolonged boiling, under decomposition, but dissolves in all proportions in acetone, ether, alcohol and fixed oils. The preparation is stated to be a good and harmless hypnotic. It is prepared by the interaction of molecular proportions of chloral and amylene hydrate. (Ph. Post.)

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

REPEAL THE LAW.

Detroit, Mich., Oct. 11, 1898.

To the Editor.—In my opinion there is no more opportune time than now to begin agitating the question of the repeal of the War Revenue Law in so far as it affects the drug business. The total war expenses have been about \$25,000,000, and of this \$200,000,000 is covered by the war loan, leaving only \$25,000,000 to be made up from the internal revenue. Commissioner Scott is authority for the statement that the law is bringing in about \$1,000,000 a day, and at this rate, the law having been in effect about three months, the revenues from this source amount to \$90,000,000. The treasury is full to overflowing, and there is no way to stop it until Congress meets and amends the law, or repeals it. In view of these facts, there will certainly be a disposition to modify or perhaps repeal the entire law, at the coming session of Congress, and I believe that the more vigorously we protest against its oppression now, the better chance we have to get rid of it.

I am quite unable to understand why the drug business, of all others, was selected for special taxation. Certainly it is not the most prosperous line of trade, and compared to the others, its volume of business is quite small. No doubt it was the intention of Congress that the druggists should collect the tax from the people who buy the goods, but, as everyone predicted, and as we all knew, this was impossible. The tax is being paid wholly by the retailers and manufacturers, mostly by the retailers, as there are but few manufacturers who, like our company, are paying the tax. Perhaps it would not be far from the truth to say that 80 to 85 per cent of the tax is coming out of the retail druggists of this country, the rest from the manufacturers. Now this is all wrong, entirely unjust. The manufacturers and retailers of drugs pay their share of the war expenses along with every other business concern by stamping their checks, telegrams, insurance policies, express receipts, legal instruments, etc., etc., and this is no small item either for a large concern. Inasmuch as that is their just share of the war tax, and we do not know of any one who is not hearing that part of it cheerfully, all that is collected from them in excess of that is unjust—to put it in good plain language, it is legal robbery. I do not think it is possible to urge this point too strongly. The special tax on medicines is just that much more than should be levied on the drug trade and should be removed because it is impossible for them to collect it from the consumers.

In the event that it should be impossible to get the tax entirely removed from medicine, I should say that the proper thing to do would be to get the law modified so that open-formula, non-proprietary medicines would be exempt from tax. This is the part of the law that is the most oppressive to the retail druggists just now, for it prevents them from putting up their own preparations, even such simple things as paregoric and syrup of squills, without paying a tax on it. While a tax on medicines of any kind is objectionable, certainly a tax on open-formula, non-proprietary goods is, by far, more onerous than a tax on secret nostrums, and other proprietary goods; and in this I believe you will agree with me. What we should do then is to try and get the tax removed entirely, and if that should be impossible, have the worst part of it repealed, and trust to future legislation to rectify the rest. I would be glad to see you take up this question and agitate it through the columns of your journal, both in editorials and through correspondence. The time has gone by for mere kicking—we ought to have done more of that before the law was passed—the thing to do now is both to kick and to take steps to make that kicking effective.

As your journal has ever manifested a sincere interest in the rights of the drug trade, I think you will see that this is a time for action. And you may be sure that the drug trade will not forget those who have befriended them in this matter. Hoping that you will see fit to begin an

aggressive campaign along the lines suggested, and that it may prove successful in accomplishing the objects sought for, I remain,

Yours very truly,
F. STEARNS & CO.,
By F. K. Stearns, president.

WILL NOT HANDLE THEM.

Whitesville, N. Y., Oct. 5, 1898.

To the Editor.—We have noticed from time to time the trend of affairs since the passage of the War Tax Law with some interest, and now that C. I. Hood & Co. are out with their calendar offer we wish to add our names to the list of those who are doing all possible to discourage the sale of dollar preparations which have been advanced above \$8 per dozen. We consider their action in this matter a direct blow against the interests of retail druggists. On their calendars they print the price of their Sarsaparilla "6 for \$5."

Now, on their circulars accompanying the calendar offer the price of Hood's Sarsaparilla is \$8.75 per dozen. By their own advertising we are compelled to sell six bottles for \$5. These same six bottles cost us \$4.35, hence we clear 62 cents on a five-dollar deal, or 12 2-5 per cent. of the retail price.

It costs us from 11 1/4 to 15 per cent. of our annual sales to keep our store running, and we do not have to pay rent.

What retailer is going to sell Hood's Sarsaparilla at a profit so close that he cannot pay 1 per cent. above his store expenses? If manufacturers think we should not "kick" when all we can get to live on is taken away from us, then when shall we?

We, as one of many are doing all we can to discourage the sale of dollar remedies which are priced above \$8 per dozen.

Our sales of Hood's Sarsaparilla for this past season are not over 1-5 what they have sometimes been. Why? Simply because we sell another article on which we can make a living profit in its place, and our cures as often as Hood's, and customers are just as well satisfied. Let every druggist "substitute" at every opportunity, until manufacturers are forced to again price their articles so we can make at least 50 per cent. on them.

Respectfully,

B. B. & H. W. SLADE.

HOW IT IS DONE IN CHICAGO.

Chicago, Oct. 7, 1898.

To the Editor.—We, Chicago druggists, have adopted the following methods of informing the public and our customers as to who pays the War Tax. We have arranged alphabetically a list of all proprietary goods that have been advanced in price owing to the stamp act, so the clerks in marking goods can affix the following Red Lettered Notice on each package as it goes on the shelves.

SPECIAL NOTICE!

We have been compelled to advance the price of this article owing to the fact that the manufacturers thereof are not patriotic enough to stand any part of the War Tax, but have even taken advantage of the exigencies of the War to advance the price to us many times over the cost of the stamps placed upon it.

189 Randolph St.,

LOUIS K. WALDRON,
Chicago.

This enables the purchaser to see at once whether he pays the tax or the retailer, at least it informs him that the man upon whose shoulders the tax was placed has succeeded in squirming out of it.

There is no class of people within my observation who are more patriotic than the patent medicine consumer, and he enjoys seeing the same spirit evinced by others. His idea of the first cost of a bottle of medicine is principally confined to the price of the bottle and cork, consequently when he learns that the man who puts up twelve ounces of burnt sugar, water and molasses for a dollar is evading a tax of two and a half cents on each bottle, he just drops both hands and ejaculates, "Well the patent medicine man is even meaner than he looks when you see his picture on the back of an almanac." I am,

Most cordially yours,
LOUIS K. WALDRON.

AN APPRENTICE'S IDEA OF A SATISFACTORY LAW.

East San Jose, Cal., Oct. 3, '98.

To the Editor.—In the Era of September 22 I noticed a request for a law regulating the tax, to take the place of the one now in effect.

Of course an "apprentice" is not supposed to know much about law, but a bill embodying the following points, I believe, would return enough revenue, and yet not be very hard on "the poor manufacturers."

I.—All medicines, specifics, salves, or preparations of a like nature, for the prevention or cure of disease, other than those authorized by the U. S. P., to be stamped at the rate of 1 per cent. of market value, i. e.

Up to and including 25c.	stamped 1/4 cent.
" " " 50c.	stamped 1/2 cent.
" " " 75c.	stamped 3/4 cent.
" " " 1.00	stamped 1 cent.
" " " 1.25	stamped 1 1/4 cent.

on, retail value.

II.—All preparations "patented" or "copyrighted" other than foods to be stamped at the above ratio.

Penalties should be added for the prevention of falsifying label and attempted evasion of the tax.

This law, or one along this line, would bring in more revenue and with less friction, than the one now in operation.

We received an open letter from "our dear friend" Pierce, dated September 25, in which he has proved that he does not like the action of "our dear friends, the retailers," but never fear, he will be in out of the wet before many moons.

The Era's crusade is bearing fruit. Continue the good work, and receive the best wishes of

"AN APPRENTICE."

CORRECTION OF A MISSTATEMENT.

In the October 6 Era appeared an editorial under the caption "The Disturbing Element," quoting a circular of a Pittsburg druggist and commenting thereon. That editorial has drawn forth the following two communications, which are gladly printed to remove a misapprehension based on insufficient information. [Ed.]

Pittsburg, Oct. 8.

To the Editor.—Your criticism of our circular in your last issue is entirely unjust, as you will see by enclosed letter. (The letter referred to is that circulated by the local association and commented upon in the communication below. Ed.)

We are a member of the local association and live rigidly up to its requirements.

Yours truly,

THOMPSON'S DRUG STORE.

Pittsburg, Pa., Oct. 7th, 1898.

To the Editor.—It is a source of pleasure to read between the lines of your editorials and find that you have the best interests of the retail pharmacist at heart. Your editorial of October 6th, entitled "The Disturbing Element," is, however, misleading to those who are not familiar with the particulars of our troubles, which I will explain in as few words as possible. The druggists of Pittsburg and Allegheny early in June formed an organization. They were, however, unable to get two (Eggers and Fahnstock) of the chief cutters to join unless they were permitted to sell six of the prominent sellers at cut prices, namely:

Paine's Celery Compound	 74 cents.
Pinkham's Compound	 74 cents.
Hood's Sarsaparilla	 74 cents.
Cuticura Soap	 19 cents.
Packer's Tar Soap	 13 cents.
Carter's Pills	 13 cents.

Acting on the principle that a half loaf is better than none, this compromise was accepted, hence you will note that Thompson, the publisher of the circular, is not so large a dog in the manger of the Western Pennsylvania Retail Druggists Association as it would appear.

Yours respectfully,
LOUIS EMANUEL.

IMPORTANT EVENTS.

Important events are likely to happen in the drug trade. You want the news every week. See special subscription offer on first editorial page.

The Era Course in Pharmacy.

CONTRIBUTORS

Ellas H. Bartley, M.D., Ph.G.
Emil L. Boerner, Ph.D.
Virgil Cohentz, A.M., Ph.D.
Wilber G. Compher, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heehner, Ph.M.B., Ph.G.
George B. Kaufman, B.Sc., Ph.D.
E. J. Kennedy, Ph.C
Henry Kraemer, Ph.G., Ph.D.
Edward Kremers, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.

CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison.
Oscar Oldberg, Phar.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Reed, M.D., C.M.
Edsel L. Ruddiman, Ph.M., M.D.
Henry H. Rusty, M.D.
Samuel P. Sailer, Ph.D.
L. E. Sayre, B.Sc., Ph.M.
Wilbur L. Seville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Welling, Ph.G., Ph.M.D.

JUNIOR COURSE. LECTURE No. 9.

Inorganic Chemistry.

The Hydrogens.

The halogens, or the Chlorin Group, Fluorin, Chlorin, Bromin and Iodin, are remarkable for their chemical activities, for the well marked chemical relationship which subsists between them, and for the pharmaceutical and chemical importance of the free elements and their compounds. The term *halogen* means literally *salt producer*, and is probably derived from the Greek *hals*, a salt, and *gennao*, to generate, since the principal source of one of the members, chlorin, is common salt. Their binary compounds with the metallic elements are known as the haloid salts, or still more simply as the *halides*. Their compounds are widely distributed throughout nature and in considerable quantities.

FLUORIN.

Symbol, F. Valence, 1. Atomic Weight, 18.91.

Historical—Compounds of fluorin have been known and their properties observed since the seventeenth century, but the element itself was not obtained in the free state until 1886. The name is derived from *spathum fluorium*, or fluor spar, its most common compound, which in turn takes its name from the Latin *fluo*, I flow, in allusion to its use as a flux in the extraction of metals.

Natural Sources.—Fluorin is found combined in nature in the fluorides, chiefly as calcium fluoride, or fluor spar, CaF_2 , and in cryolite, $\text{AlF}_3 \cdot 3\text{NaF}$, a mineral found in great quantities in Greenland. It also exists in small amounts in sea water, in the water of certain mineral springs, and in the teeth, bones and other tissues of the mammalia. It is also stated to occur free in minute quantities in the cavities of certain crystals of fluor spar.

Preparation.—The isolation of fluorin in the free state, though frequently attempted, was not placed beyond doubt until it was obtained by Moissan in 1886, by the electrolysis of anhydrous hydrofluoric acid, in a vessel of platinum with stoppers of fluor spar, the apparatus being maintained at a low temperature. All previous efforts had been frustrated by the intense activity of the element, which caused it to combine as fast as released with the material of the vessel in which it was freed.

Physical Characters.—Fluorin is described as a pale yellow-green, or nearly colorless gas, possessing a penetrating and intensely irritating odor, which is said to resemble that of hypochlorous acid.

Chemical Properties.—Fluorine is chemically the most active element known, and combines energetically with nearly every other substance. With many metals and organic substances it combines so vigorously as to yield the essential phenomena of combustion, light and heat, and hence, like oxygen, may be said to be a supporter of combustion, except that in this respect its

energy far exceeds that of the latter element. It is said that a substance like cork dropped into the element takes fire instantly. At ordinary temperatures it unites readily with boron, silicon and sulfur, but does not attack gold, platinum or oxygen. It readily attacks glass and other silicates, forming the gaseous silicon tetrafluoride, SiF_4 . It instantly decomposes water, uniting with the hydrogen to make hydrofluoric acid, and setting the oxygen free in the form of ozone. With hydrogen it unites explosively, even in the dark, and at a low temperature.

Uses.—The free element is at present of merely scientific interest, but its hydrogen acid and some of the fluorids have a limited application in the arts.

Compounds of Fluorine.

As might be surmised from its intense activity, fluorine unites with almost all other elements. It does not, however, unite with oxygen either directly or indirectly, nor with bromine, chlorine, carbon or nitrogen, and possibly not with some of the rarer elements. Of its known compounds, the fluorides and hydrofluosilicic acid are the more important.

Hydrogen Compound.—Fluorin forms one compound with hydrogen, known as Hydrofluoric Acid.

Hydrofluoric Acid. HF or H_2F_2 .—The free acid is a colorless liquid, boiling at 19.4°C ., and only less active

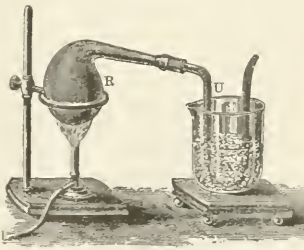
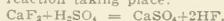


Fig. 18.—Preparation of Hydrofluoric Acid. their silica to form the vola-

the silicon tetra fluorid, SiF_4 . It is prepared by decomposing a fluorid, usually calcium fluorid, by sulfuric acid and distilling from a platinum or lead still. (Fig. 18), the following reaction taking place:

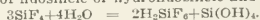


On account of its action on silica, the solution must be preserved and transported in vessels made of platinum.

lead, gutta percha, ceresin, etc. Extreme caution must be observed in handling the acid, since when brought into contact with the skin it produces dangerous sores very difficult to heal. The vapor is also dangerously poisonous when inhaled.

From variations in its vapor density, the gaseous acid is presumed to have the formula, H_2SiF_6 at and below 30° Centigrade. This is further rendered probable by the fact that acid fluorides, as KHF_2 , are known, which would not be possible if the molecule contained only one atom of hydrogen. At 100° C. its vapor density corresponds to the formula HF , which is the formula commonly made use of to represent the acid.

Hydrofluosilicic Acid. H_2SiF_6 .—When silicon tetrafluoride is conducted into water, it decomposes with the production of fluosilicic or hydrofluosilicic and silicic acids.



The acid solution can be separated from the gelatinous silicic acid by straining and concentrating by evaporation. It is an unstable compound, and breaks up at a boiling temperature. It is of little importance.

Uses.—The principal use of hydrofluoric acid depends upon its affinity for silica, which makes it a valuable agent for engraving the scales upon thermometers, and other articles of glassware. The object to be etched is first covered with some substance, such as paraffin or beeswax, and the design scratched in the film so as to expose the glass.

The article is then supported over a vessel containing the aqueous acid, and the fumes as they arise attack and dissolve the exposed portions of the glass, the wax or paraffin being afterward removed by solvents, leaving the design etched in the glass. The reaction which takes place may be represented as follows:



CHLORIN.

Symbol, Cl. Valence, 1, 3, 5, 7. Atomic Weight, 35.18.

Historical.—Chlorin was discovered by Scheele, of Sweden, in 1774, who regarded it as hydrochloric acid deprived of phlogiston. For a long time it was considered by chemists to be a compound of hydrochloric acid and oxygen, until in 1810 Sir Humphrey Davy finally established its elementary nature and named it from the Greek *chloros*, green, because of its greenish color.

Natural Sources.—Chlorin occurs in nature combined chiefly with the metals, most commonly as the chlorides of sodium, potassium and magnesium. Its most abundant source is common salt, found in sea water and in deposits of rock salt, which have probably resulted from the evaporation of former portions of the sea.

Preparation.—1. By electrolyzing hydrochloric acid or a solution of its chlorides.

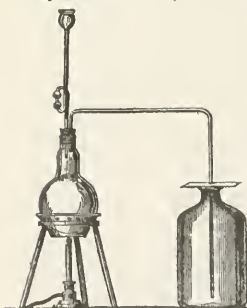


Fig. 19.—Generation of Chlorin.

2. By the action of hydrochloric acid on a peroxid, as manganese dioxide, MnO_2 , or some other strong oxidizing agent. (Fig. 19).

3. By the action of sulfuric acid on a chlorid in the presence of a peroxid. This process is essentially the same as the preceding, hydrochloric acid being first set free from the salt and then reacting upon the peroxid.

4. On a commercial scale chlorin is prepared in large quantities from the hydrochloric acid product as a by-product in the Leblanc soda process.

Of the several methods employed, one is the Weldon process, by heating the acid with manganese dioxide; the Deacon process, or the decomposition of the acid by passing it over heated bricks saturated with sodium and cupric sulfate, besides several others which need not be mentioned.

Physical Characters.—Chlorin is a greenish-yellow gas, becoming darker when heated, heavier than air,

of a penetrating, suffocating and corrosive odor and irrespirable and poisonous if undiluted. It is 35.18 times heavier than hydrogen. Water at 10° C. dissolves about two and a half times its volume of the gas, yielding a greenish-yellow solution. Above this temperature the solubility decreases and at 100° C. it ceases to dissolve any. Near the freezing point the element unites with water to form a crystalline hydrate having the composition $Cl \cdot 5H_2O$, which on standing gradually decomposes into chlorin and water.

At atmospheric pressure and a temperature of -40° C. chlorin can be condensed to a dark yellow liquid, immiscible with water, and a non-conductor of electricity.

Chemical Properties.—Chlorin unites directly with nearly all other elements, in many cases with so much energy as to yield the essential phenomena of combustion, light and heat, especially if the added element be in a finely divided state.

Chlorin is remarkable for its powerful bleaching effect upon organic colors. This occurs only in the presence of moisture, and is an indirect reaction. The chlorin, through its strong affinity for hydrogen, decomposes the water into its constituents and unites with the hydrogen to form hydrochloric acid, while the released oxygen attacks the coloring matters, oxidizing them to colorless compounds. It is no doubt to this power of setting oxygen free from water that chlorin largely owes its valuable disinfecting and deodorizing properties.

A mixture of hydrogen and chlorin may be kept for years unchanged if prepared and preserved in the dark, but upon being brought into a bright light the gases unite with explosive violence, hydrochloric acid being the product.

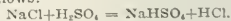
Compounds of Chlorin.

Chlorin forms five hydrogen acid, HCl , three unstable oxides, Cl_2O , Cl_2O_2 , ClO_2 , and four more or less stable oxygen acids, $HClO$, $HClO_2$, $HClO_3$, and $HClO_4$.

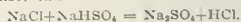
Hydrochloric Acid. HCl .—A colorless gas of strong and irritating odor, somewhat resembling chlorin. An aqueous solution of this gas, more or less pure, and of varying strength, constitutes the hydrochloric acid of the laboratory and of commerce.

Hydrochloric acid is formed when chlorin acts upon compounds containing hydrogen. It is prepared commercially as a by-product in the Leblanc soda process, in which sodium chlorid is treated with sulfuric acid, forming sodium sulfate and hydrochloric acid. The latter is then conducted through towers filled with coke, where it is met by a descending stream of water which dissolves the gas, the resulting solution being drawn off at the bottom and constituting the hydrochloric acid of commerce. As prepared in this way the acid is always colored by iron and organic matter. The pure, colorless acid must be prepared from pure materials.

The reaction which takes place between sodium chlorid and sulfuric acid when heat is not applied may be represented as follows:



If the mixture now be heated, the acid sodium sulfate reacts with another molecule of the chlorid, setting free its chlorin also, thus:



The amount of the gas which will dissolve in water depends upon the temperature and pressure. At 0° C. and atmospheric pressure, water dissolves 503 volumes, forming a solution containing 43 per cent. of the acid. If this solution be heated, the gas evaporates till it reaches the strength of 20.24. If a solution weaker than this is heated, the water evaporates and the solution grows stronger until the same strength is attained, when the strength remains constant until all is evaporated.

Uses.—Immense quantities of hydrochloric acid are used in the arts and manufacturing chemistry. It is the main source of chlorinated, and in the pure state is used largely in the manufacture of pharmaceuticals and as a reagent in the laboratory.

Characteristic Reactions.—A characteristic reaction of hydrochloric acid and the soluble chlorides is the yielding of insoluble white chlorides when added to solutions of silver, lead and mercurous salts. Lead chlorid is sparingly soluble in cold water, freely so in hot water. Silver chlorid is insoluble in water and acids, but dis-

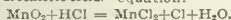
solves in ammonia water. Mercurous chlorid turns black with ammonia water.

PRACTICAL STUDIES.

1. In a leaden dish, or in a porcelain dish lined with tin foil, place some powdered fluor spar. Lay a small lump of beeswax or paraffin on a small plate of glass and heat, at first very gently, until the glass is completely covered with a thin film. Let cool, and with a sharp instrument trace a name or some other design through the wax. Now pour a little sulfuric acid over the powdered fluor spar, stir it together with a bit of stick, and lay the plate, waxed side down, over the dish. Set away for several hours or until the next day, then with a knife blade clean away the wax. Unless the design was clearly traced through to the glass, the acid will not have etched it.

Avoid inhaling the fumes from the dish, or getting any of the mixture of fluor spar and acid on the hands or clothing.

2. Place one or two grams of manganese dioxid in a test tube, add two or three Cc. of hydrochloric acid, mix well and warm. (Fig. 20). Immediately the tube becomes filled with the suffocating yellow fumes of chlorin. If larger quantities of chlorin are wanted, a flask fitted with a delivery tube should be used. (Fig. 19). The gas being heavier than air, can be collected by having the delivery tube reach to the bottom of an empty jar. Balance the equation:



3. Hold a narrow strip of dry calico in the test tube

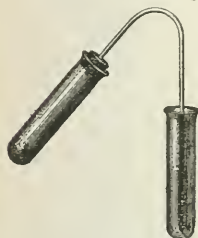


Fig. 20—Test Tube Generator for Chlorin or Hydrochloric Acid.

without touching the side. Note the result. Now wet the strip with water, wring it out and hold it in the tube again. Explain the reason for the different result.

4. Wet a narrow strip of filtering paper with turpentine and hold it inside of a tube in which chlorin is being actively evolved. Note that it either bursts into flame, or smokes, and that the paper becomes covered with a black deposit. (Fig. 21). What is the black substance? On the assumption that $\text{C}_{10}\text{H}_{16}$ represents the molecule of turpentine, how do you explain the reaction which takes place?

5. Take a visiting card or other slip of paper with printing upon it. Cover the paper with writing fluid until the printed words are completely obscured. While damp, hold in a vessel containing chlorin. How can you account for the different effect upon the printer's and writing inks?



Fig. 21—Action of Chlorin on Turpentine.

6. Place several grams of sodium chlorid in a test tube which is fitted with a delivery tube, add two or three cubic centimeters of sulfuric acid and heat the mixture. (Fig. 20). Pass the evolved gas into some water contained in a second tube. (Be sure to remove the delivery tube from the water before the generator tube is removed from the source of heat). Use the solution of gas thus obtained for the next experiment.

Write an equation showing the reaction of sodium chlorid and sulfuric acid.

7. Place in different test tubes several cubic centimeters of solutions of silver nitrate, lead acetate and mercurous nitrate, and to each add a few drops of hydrochloric acid or a solution of sodium chlorid. Note what occurs, and write equations showing the reactions which take place.

8. Pour off the liquid from the precipitate obtained in the last experiment, and test each precipitate first with hot water, and then, after pouring out the water, with ammonia water. Which dissolves? Which turns black?

JUNIOR COURSE, LECTURE NO. 10.

Pharmaceutical Physics.

Pneumatics.

Compressibility of Gases.—While liquids are practically incompressible, gases are the most compressible bodies known.

The relation of their volume to the pressure they are subjected to is expressed in what is known as Boyle's, and also as Mariotte's, Law, which may be stated in general terms as follows: *Temperature remaining the same, the volume of a gas varies inversely as the pressure to which it is subjected.* If the pressure be doubled, the volume will be reduced one-half; if the volume be doubled, the pressure will be reduced one-half, etc.

Since one of the factors increases to the same extent that the other decreases, it follows that for any given amount of gas the product obtained by multiplying its volume by its pressure will be a constant quantity as long as the temperature remains constant. For example, if the volume of a gas be 100 Cc. and its pressure 1000 Gm., the product of these two quantities, 10×1000 , will equal 10,000. If now the pressure be doubled, the volume will be halved, but the product (5×2000) will remain the same quantity, and so on for any other variation.

The law is not constant for extreme limits of pressure.

Pharmaceutical Applications.—Boyle's Law affords a convenient method of correcting the volume of gases found in analytical operations, so as to make them conform to standard pressure. For example, the gas in a nitrometer measures 42 Cc. when the barometer stands at 740 mm. What would be its volume at the standard pressure of 760 mm? The product of the observed volume by the observed pressure will be $42 \times 740 =$

$31,080$. Since the product is a constant quantity for any pressure, the volume at 760 mm. would be $\frac{31,080}{760} = 40.89$ Cc.

Influence of Temperature on Volume.—Gaseous volumes are greatly influenced by temperature, increasing with the addition of heat and decreasing with its withdrawal. If we consider the volume of a gas at 0°C . and under constant pressure, then its expansion will be 0.00367, nearly, of that volume for each additional degree of temperature. This fraction is known as the Coefficient of Gaseous Expansion, and enables us to calculate changes in the volumes of gases due to changes in temperature. For example, the volume of a gas is 840 Cc. at 0°C . What volume will it have at 18°C ., the pressure remaining unchanged?

If one Cc. expands 0.00367 for one degree it will expand 18×0.00367 for 18 degrees, and for 840 Cc. the expansion will be 840 times the expansion of one Cc., or $840 \times 18 \times 0.00367 = 55.49$ Cc., the expansion for 18 degrees. Hence the new volume will be $840 + 55.49 = 895.49$ Cc. (For a fuller consideration of the variations in the volumes of gases from variations in temperature and pressure, the student is referred to Notes on Equation Writing and Chemical Arithmetic, by J. H. Beal).

Pressure of the Atmosphere.—In general the same laws apply to gases as to liquids, including the equal transmission of pressure in all directions, though on account of their great compressibility, the law of regular increase of pressure with increase of depth does not apply.

Torricelli's Experiment.—That the atmosphere really does possess weight can be shown by Torricelli's

Experiment. A glass tube, closed at one end, is filled with mercury, the open end closed with the thumb, the tube inverted and the open end dipped under mercury contained in a vessel. The pressure of the atmosphere will maintain the liquid in the tube. (Fig. 22).

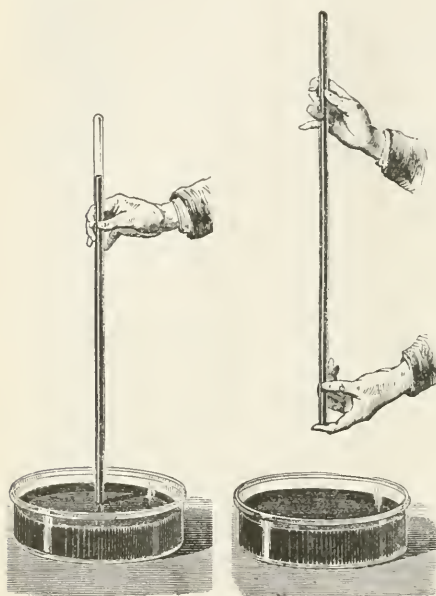


Fig. 22.—Torricelli's Experiment.

That it is the air pressure which sustains the column can be proved by placing such an apparatus of smaller size under the receiver of an air pump and exhausting the air, when the mercury promptly falls out of the tube.

The Barometer.—Such a tube of sufficient length and fastened with its mercury cistern to a suitable support, constitutes the mercurial barometer in its simplest form. (Fig. 23). The mercury cistern (concealed in the figure), being left open to the air, variations in the pressure of the latter will be indicated by corresponding elevations or depressions of the mercury column.

Other liquids might be used in the barometer instead of mercury; the only advantages of the latter liquid are its great weight, whereby a shorter tube may be used, and its low freezing point. Water would not only be liable to freezing, but the column would have to be 34 feet high.

The Aneroid Barometer, which has the advantage of occupying smaller space, and of portability, consists of a corrugated metallic box, from which the air has been partially exhausted. The box alternately contracts and expands with the variation in atmospheric pressure, and in so doing causes the movement of a pointer over a graduated dial. (Fig. 24). The Aneroid must, of course, be standardized at the factory by comparison with an accurate mercurial barometer.

That air at the surface of the earth is under great compression can be shown by placing a partially inflated rubber balloon or bladder under the receiver of an air pump, and then exhausting the air, when the residual air in the balloon will expand the latter until it may nearly fill the receiver.

Commonly we are aware of the presence of the atmos-

phere only by the act of respiration, by its temperature, and by the friction of the winds. If it possesses weight we are not sensible of it. Really, however, it does possess weight, and our bodies are subject to enormous pressure in consequence, but the tissues being everywhere supported by corresponding pressure from within, we pass through the air, like fishes in the sea, unaware of the tremendous burden on our shoulders.

That the air is greatly condensed in its lower layers is shown by carrying a barometer up a mountain side. At an elevation of three and a half miles, the column will fall to one half its length, showing that one half of the whole mass of the atmosphere lies below that level.

Standard Pressure.—Since the volume of a gas varies greatly with the pressure, it is necessary to adopt a standard pressure to which all volumes may be calculated. For this there has been selected the average height of the mercury column at the sea level, or 760 millimeters. Since a column of mercury one square cm. in cross section, and 760 mm. high weighs 1033 Gm., the latter expresses the average sea level pressure of the atmosphere on each square centimeter. This is approximately equivalent to 14.7 pounds to the square inch. High pressures are commonly reckoned in "Atmospheres." Thus 5 atmospheres means five times the standard atmospheric pressure, or $1033 \times 5 = 5165$ Gm. to the square centimeter.

The Air Pump.—An important aid in the study of atmospheric pressure and its effects upon other material is the Air Pump. (Fig. 25). In its most common form this consists of a piston, working up and down in a cylinder, the latter being connected by a tube with a smoothly ground plate, over which a glass vessel or "receiver" is inverted. At the junction of the pump barrel there is a valve, and in the piston another, both

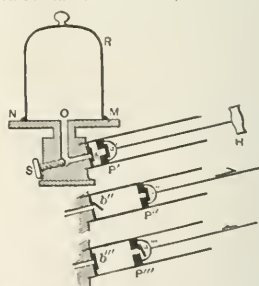


Fig. 25.—Principle of the Air Pump.

of which open upwards. When the piston is raised, it tends to create a partial vacuum below it. This releases the pressure on the air in the receiver, part of which rushes out through the open valves into the pump barrel. When the piston starts to descend, the lower valve falls into place, preventing return of air to the receiver, while that in the barrel escapes through the valve in the piston. This operation may be continued until the expansive force of the air in the receiver is no longer sufficient to raise the valve in the pump, when the exhaustion ceases. By the use of mechanically moved valves, the exhaustion can be carried to a much higher degree, but can never be complete.

The Mercury Pump.—Where very high vacua are required, it is common to make use of a mercury air pump, one of the most simple forms being known from its inventor as the Sprengel pump. (Fig. 26). In this apparatus a column of mercury falls through a glass tube, to the side of which is attached a connection with the vessel to be exhausted. The mercury column in falling tends to break into cylinders, and the air of the attached vessel expanding to fill the spaces between these cylinders is swept by them down and out of the tube. A modification of this pump can be operated with water instead of mercury, where there is sufficient fall. The exhaustion is always very slow with pumps of this type.

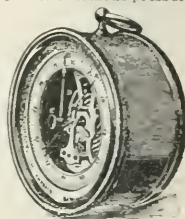


Fig. 24.—Aneroid Barometer. column will fall to one half its length, showing that one half of the whole mass of the atmosphere lies below that level.



Fig. 23.—Mercurial Barometer.

Pharmaceutical Applications.—Some form of the Sprengel pump, operated either by mercury or water, may frequently

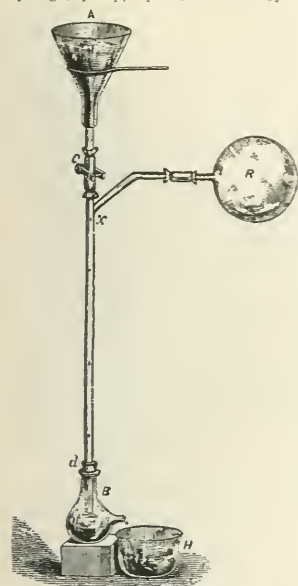


Fig. 26.—Sprengel's Air Pump.

be used to advantage in pharmaceutical operations. In chemical assay work it is common to use these pumps to hasten filtration, the funnel being connected at the bottom with a flask attached to the lateral tube of the pump. The air being exhausted from the flask, the pressure of the air above hastens the passage of the liquid through the filter to supply the vacuum. In such cases the apex of the filter must be supported or it will rupture under the pressure.

A similar arrangement may be made use of to hasten the process of percolation.

The Lift Pump for Liquids.—If the lower end of the air pump first described be connected with a vessel of

water, it will raise and deliver that liquid instead of air, provided the vessel from which the water is drawn is open to the atmosphere. A delivery spout is attached near the top. (Fig. 27). The admission of air to the surface of the water is necessary, since it is the pressure of the atmosphere which forces the water up the pump stock to fill the vacuum, which would otherwise be created by raising the piston. What is popularly attributed to a mysterious power of "suction" is due wholly to the atmosphere pressing on the surface of the water around the pump. If the latter were inserted into a barrel, and the barrel closed against ingress of air, it would be impossible to draw out the liquid by such a pump.

Since the column of water is lifted by air pressure, it follows that the lift pump will not work if the distance from the piston valve is greater than the length of the water column which the atmosphere can sustain. This at the sea level, is 34 feet, but in actual practice it is not possible to make the distance so great. If the water is to be lifted to a greater height, the force pump is employed.

The Force Pump.—The Force Pump differs from the lift pump in having a valve in the side of the pump barrel instead of in the piston. When the barrel has been filled, the downward thrust of the piston forces the

liquid out of the side valve. (Fig. 28). With such a mechanism the liquid is delivered in spurts with each stroke of the piston. To regulate the pressure and cause the delivery of the liquid in an even stream, it is usual to add a hollow chamber, the upper part of which is always filled with air. The water, being forced into this chamber against the air, the latter is compressed like a cushion or spring, and in expanding keeps up the

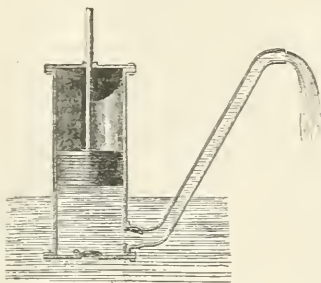


Fig. 28.—Force Pump.

pressure until the delivery of the next stroke.

The Siphon.—Another instrument which finds use in pharmacy is the Siphon. (Fig. 29). This is in shape like an inverted U, usually with one limb longer than the other. The siphon having been filled, one limb is immersed below the surface of the liquid to be drawn

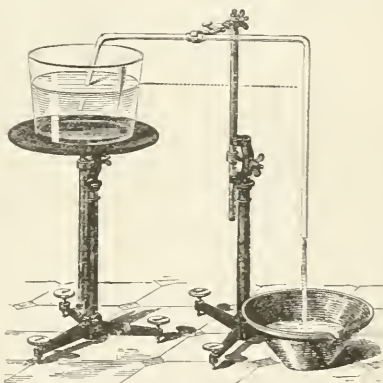
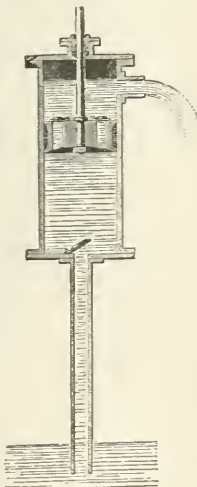


Fig. 29.—Siphon.

off, and the other allowed to project over the side of the vessel. Under such circumstances, a flow will take place through the siphon, and continue until either the surface of the liquid attains the same level in both vessels, or until it is drawn off below the opening of the limb through which it enters.

The action of the siphon is due both to gravity and to the pressure of the atmosphere. Both legs being filled with liquid, that in the longer leg is consequently heavier and determines the direction of the flow. If, however, gravity alone operated, the cohesion of the liquid would not be sufficient to prevent the column from breaking in two at the bend and each leg emptying itself. This is prevented by the pressure of the air, which keeps the siphon filled. If the siphon be very small, so that cohesion is sufficient to hold the liquid column together, the flow will continue even in a vacuum.

As the short leg is kept filled by atmospheric pressure, it follows that the latter must be less than 34 feet in length. In practice the siphon will not work successfully even near the limit. If a heavier liquid than water is to be moved, the perpendicular distance from the surface of the liquid to the bend in the siphon must be as much less than 34 feet, as water is lighter than the liquid. For example, with mercury the distance would have to be less than 76 cm. In every case the liquid must be delivered to a point below the surface in the vessel from which it runs.



Pharmaceutical Applications.—In pharmacy the siphon finds application in drawing off liquids from sediment which it is desired not to disturb, in the handling of acids, etc. The siphons used for this purpose may be of glass, metal, rubber or stoneware. For general purposes a rubber tube serves excellently. Commonly the siphon is filled by suction. Some convenient siphons for moving corrosive or poisonous liquids have a pump attachment for filling.

The Atomizer.—Another apparatus of pharmaceutical importance is the common Atomizer, an instrument for producing a fine spray of perfume or medicinal solution. It consists of a bottle to hold the solution, and furnished with a rubber bulb, which by compression directs a blast of air across the open end of a tube extending into the liquid. The current of air by adhesion draws the air out of the tube, which then fills with liquid, and this, as it leaves the tube, is caught up and driven into fine spray by the issuing blast. (Fig. 30).

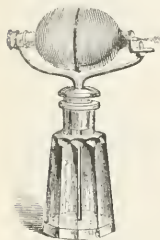


Fig. 30.—Atomizer.

PRACTICAL STUDIES.

(1) Perform the experiment of Torricelli, using water if mercury is not available.

(2) Fill a thin soda tumbler to the brim with water. Lay over the surface a square of thin, stiff paper; hold the paper against the tumbler with the left hand, and with the right hand invert the tumbler. (See Fig. 31). What holds the water in the tumbler? What sustains the liquid in a pipette? Why is the paper necessary?



Fig. 31.—Tumbler Experiment.

(3) Prepare a siphon by bending a glass tube of small diameter, or use a piece of rubber tubing instead. Place one end under water in a glass and catch the water delivered in a second glass. What occurs when the water reaches the same level in both? Raise the second vessel until the surface of the water in it is above that in the first vessel. What now takes place?

(4) Is there such a principle or force as "suction"? Partly fill a narrow tube, closed at one end, with water. Apply the open end to the mouth and attempt to draw the liquid out of the tube by suction. Why do you not succeed? What would be the effect if there was an opening in the bottom of the tube?

SENIOR COURSE. LECTURE No. 9.

Official Preparations.

SYRUPS.—(Continued.)

B.—Made from Extemporized Medicated Waters.

Four of the Cold Process syrups are made by first preparing a medicated or aromatic water from a tincture or fluid extract, with the aid of Precipitated Calcium Phosphate, and then dissolving in this the requisite amount of sugar.

Three are prepared from tinctures and one from a fluid extract.

Syrupus Aurantii. Syrup of Orange.—Place 50 Gm. of fresh Orange Peel, free from the white inner layer, and 80 Cc. of Alcohol in a thin flask, stopper loosely and boil on a water bath for five minutes. Cool, filter and rinse flask and filter with alcohol to make 100 Cc. of tincture. Add gradually, with constant trituration, to 50 Gm. Precipitated Calcium Phosphate and 150 Gm. Sugar, and then 300 Cc. of water with constant trituration. Filter, returning the filtrate until it runs clear. In the filtrate dissolve 550 Gm. Sugar, and add through the filter enough water to make 1000 Cc.

Syrupus Toluianus. Syrup of Tolu.—Dissolve 10 Gm. Balsam of Tolu in 50 Cc. Alcohol with a gentle heat, and add, with constant trituration, to 50 Gm. Precipitated Calcium Phosphate and 150 Gm. Sugar, and set aside until the alcohol has evaporated. Triturate the dry residue with 500 Cc. Water, gradually added, and filter through a wetted filter, returning the first portions until it runs clear. Heat the filtrate to 60° C., add 700 Gm. Sugar and dissolve by agitation. Cool, strain and add water through the strainer and filter to make 1000 Cc.

Syrupus Lactucarii. Syrup of Lactucarium.—Add gradually, with trituration, 100 Cc. Tincture of Lactucarium to 50 Gm. Precipitated Calcium Phosphate and 150 Gm. Sugar, and then 300 Cc. water also added gradually, with trituration. Filter, dissolve 600 Gm. Sugar in the filtrate, and pass enough water through the filter to make 1000 Cc.

Syrupus Zingiberis. Syrup of Ginger.—Triturate 30 Cc. Fluid Extract of Ginger with 15 Gm. Precipitated Calcium Phosphate, and expose in a warm place until the alcohol has evaporated. Triturate the dry residue with 450 Cc. Water, filter, and dissolve in the filtrate 550 Gm. Sugar. Strain and pour sufficient water through the strainer to make 1000 Cc.

C.—Made from an Official Aromatic Water.

One syrup is made by dissolving the proper amount of sugar in an official Aromatic Water.

Syrupus Aurantii Florum. Syrup of Orange Flowers.—Dissolve 850 Gm. Sugar by agitation, without heat, in 450 Cc. Orange Flower Water, and add a sufficient quantity of the latter to make 1000 Cc. A pleasantly fragrant adjuvant syrup.

D.—Made from an Extemporized Seed Emulsion.

One official syrup is made by dissolving sugar in an extemporized emulsion.

Syrupus Amygdali. Syrup of Almond.—Blanch 140 Gm. Sweet Almond and 40 Gm. Bitter Almond and rub to a paste in a mortar, with 100 Gm. Sugar and 30 Cc. Water. Add 100 Cc. Orange Flower Water and 200 Cc. water and strain with strong expression. Add 100 Cc. water to the residue and again express. Dissolve 100 Gm. Sugar in the expressed liquid and add sufficient syrup to make 1000 Cc. Keep in a cool place, in completely filled and well stoppered bottles.

3. Syrups Made by Admixture of Syrup and Medicating Liquid.

Six official syrups are made by simply mixing together the medicating liquid with the proper amount of simple syrup. The only point to be observed in their manufacture is to see to it that the medicating liquids are of proper quality and that the syrup is fresh and of proper sugar strength.

Two are made from aqueous solutions, one from an aromatic tincture, and three from fluid extracts.

A.—The Medicating Liquid Is an Aqueous Solution.

Syrupus Acacii. Syrup of Acacia.—Mix 25 Cc. recently prepared Mucilage of Acacia with 75 Cc. Syrup. Should be freshly prepared when wanted.

Syrupus Acidii Citrici. Syrup of Citric Acid.—Dissolve 10 Gm. Citric Acid in 10 Cc. Water and mix with 500 Cc. Syrup. Add 10 Cc. Spirit of Lemon and sufficient syrup to make 1000 Cc., and mix.

B.—The Medicating Liquid Is an Aromatic Tincture.

Syrupus Rhubarbi Aromaticus. Aromatic Syrup of Rhubarb.—Mix 150 Cc. Aromatic Tincture of Rhubarb with 850 Cc. Syrup.

C.—The Medicating Liquid Is a Fluid Extract.

Syrupus Kramerie. Syrup of Krameria.—Mix 450 Cc. Fluid Extract of Krameria with 550 Cc. Syrup.

Syrupus Rose. Syrup of Rose.—Mix 125 Cc. Fluid Extract of Rose with 875 Cc. Syrup.

Syrupus Rubi. Syrup of Rubus.—Mix 250 Cc. Fluid Extract of Rubus with 750 Cc. Syrup.

4. Made from Medicinal Vinegars or Containing Acetic Acid.

Three official syrups contain Acetic Acid, and therefore correspond more or less to the ancient oxymels. One is prepared from an official vinegar, one from an extemporized medicinal vinegar, and one from a fluid extract, with addition of acetic acid. Metallic utensils must be avoided in their preparation.

A.—From an Extemporized Medicinal Vinegar.

Syrupus Allii. Syrup of Garlic.—Macerate 200 Gm. Fresh Garlic, sliced and bruised, with 300 Cc. Diluted Acetic Acid for four days, and express. Mix the residue with 200 Cc. Diluted Acetic Acid and again express. Mix the expressed liquids, filter, and dissolve in the filtrate 800 Gm. Sugar, by agitation without heat. Add sufficient Diluted Acetic Acid to make 1000 Cc.

Keep in a cool place, in completely filled, well stoppered bottles.

B.—From an Official Vinegar.

Syrupus Scillæ. Syrup of Squill.—Heat 450 Cc. Vinegar of Squill to the boiling point in a glass or porcelain vessel, filter while hot, and dissolve 500 Gm. Sugar in the hot liquid without further heating. Strain, and when cold add sufficient water through the strainer to make 1000 Cc.

C.—From a Fluid Extract, with Addition of Acetic Acid.

Syrupus Ipecacuanhæ. Syrup of Ipecac.—Dilute 70 Cc. Fluid Extract of Ipecac with a mixture of 300 Cc. water and 10 Cc. Acetic Acid, and mix thoroughly by shaking. Filter, and pass sufficient water through the filter to make 500 Cc. Add 100 Cc. Glycerin, dissolve 700 Gm. Sugar in the mixture, strain and pass sufficient water through the strainer to make 1000 Cc.

SUB-CLASS II.

SYRUPS OF INORGANIC SUBSTANCES.

The members of this sub-class are six in number, and include those syrups whose most important constituents are wholly or mainly inorganic. They all involve a more or less decided chemical reaction in their manufacture, though the exact chemical nature of the dissolved substances is in several cases indefinite. Two of the syrups are made by first preparing solutions of the medicinal substances, which are then mixed with the proper amount of unmedicated syrup, two by the preparation of a medicated liquid in which sugar is dissolved without the aid of heat, one by dissolving the medicating substance and sugar with heat, and one by dissolving solid substances in another medicated syrup.

1. Sugar Dissolved in the Medicating Liquid with Heat.

Syrupus Calcis. Syrup of Lime.—65 Gm. Lime and 400 Gm. Sugar are mixed by trituration and added to 500 Cc. Boiling Water, in a bright copper or tinned iron vessel, and the boiling continued for five minutes. It is then strained, diluted with an equal volume of water and filtered through white paper. The filtrate is evaporated to 700 Gm. and then brought to 1000 Cc. by the addition of water.

The syrup must be preserved in well corked bottles. The purpose of this syrup is to afford a concentrated solution of lime, which is sparingly soluble in water, but combines with sugar to form a freely soluble saccharate.

2. Sugar Dissolved in the Medicating Liquid Without Heat.

Two of the inorganic syrups belong to this group, in both of which a medicated liquid is first prepared in which sugar is dissolved by agitation without heat.

Syrupus Calcis Lactophosphatis.—Syrup of Calcium Lactophosphate.—Gradually add 25 Gm. Precipitated Calcium Carbonate to 60 Cc. Lactic Acid and 100 Cc. Water, in a capacious mortar until dissolved. To this add 36 Cc. Phosphoric Acid and triturate until the precipitate formed is dissolved, then add 150 Cc. of water and filter, rinsing the mortar and filter with 75 Cc. more of water. To the mixed filtrate add 25 Cc. Orange Flower

Water and 700 Gm. Sugar, and dissolve the latter by agitation without heat. Strain and add water through the strainer to bring the measure to 1000 Cc.

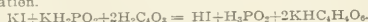
Syrupus Hypophosphitum. Syrup of Hypophosphites.—Triturate 45 Gm. Calcium Hypophosphite and 15 Gm. each of Sodium and Potassium Hypophosphite with 450 Cc. Water until dissolved. Add 5 Cc. Spirit of Lemon and 2 Gm. Diluted Hypophosphorous Acid and filter. Dissolve 500 Gm. Sugar in the filtrate by agitation without heat, and add sufficient water through the strainer to bring the measure to 1000 Cc.

3. Made by Admixture of Medicating Liquid and Syrup.

These syrups are two in number, the most important part of their manufacture consisting in the preparation of the medicating liquid.

Syrupus Acidi Hydriodici. Syrup of Hydriodic Acid.—Dissolve 13 Gm. Potassium Iodid and 1 Gm. Potassium Hypophosphite in 15 Cc. of water, and mix with a solution of 12 Gm. Tartaric Acid in 25 Cc. Diluted Alcohol. Cool the mixture with ice water for half an hour, with occasional agitation. Filter and rinse the vial and filter with diluted alcohol. Evaporate the liquid on a water bath to 50 Gm., and when cold mix with sufficient syrup to bring the weight to 1000 Gm.

When the tartaric acid is added to the potassium salts, hydriodic and hypophosphorous acids are produced, and potassium bitartrate precipitated, and removed by the filtration.

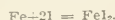


The hypophosphorous acid being a powerful reducing agent, prevents the decomposition of the hydriodic acid and the release of iodine on standing.

The finished syrup should contain about 1.3 Gm. absolute hydriodic acid in 100 Cc. or about 1 per cent. by weight, and it should not show more than traces of free iodine when treated with starch solution.

Syrupus Ferri Iodidi. Syrup of Ferrous Iodid.—25 Gm. Bright Iron Wire and 83 Gm. Iodin are placed in a flask with 150 Cc. of Distilled Water, and the mixture shaken occasionally until the iodine has all combined with the iron, the violence of the reaction being checked, if necessary, by immersing the flask in cold water. The liquid is then heated to boiling and filtered directly into 600 Gm. of syrup, the flask and filter rinsed with a mixture of 25 Cc. each of syrup and Distilled Water, previously heated nearly to the boiling point, and the rinsings added to the syrup. Enough more syrup is then added to bring the weight of the finished product to 1000 Gm., and the whole mixed thoroughly.

When the iodine and iron are brought together, ferrous iodid is formed.



The object of heating the solution is to expel any dissolved oxygen which would cause the iron in time to change from the ferrous to the ferric condition.

This syrup must be kept in small bottles, completely filled and well stoppered. It contains about 13.4 Gm. of ferrous iodid in 100 Cc., or about 10 per cent. by weight, and should not show the presence of free iodine when mixed with starch solution.

4. Solid Dissolved in a Medicated Syrup.

Syrupus Hypophosphitum Cum Ferro. Syrup of Hypophosphites with Iron.—10 Gm. each of Ferrous Lactate and Potassium Citrate are triturated with a small quantity of Syrup of Hypophosphites until dissolved, and the mixture strained. To the strained liquid sufficient Syrup of Hypophosphites is added to bring the measure to 1000 Cc.

This syrup is unstable and should be prepared as required.

CACAOPIHEN is a new nutritive preparation placed on the market by A. Siebert. It is a mixture of dextrinated rice flour, leguminous flour and pure cacao (commonly but incorrectly called cocoa). The product contains 12 per cent. of fat, which is less than half the quantity contained in pure cacao, 26 to 31 per cent., but the quantity of proteins, about 26 per cent., is not reduced. The nutritive value of cacao is thus maintained in the new product, while it is much more easily digested. It is recommended particularly for weak and anæmic children and those suffering with indigestion. Its agreeable taste makes it of additional value in the treatment of children. (Ap. Ztg.).

SENIOR COURSE, LECTURE NO. 10.

Pharmaceutical Latin.

BY PROF. WILBER G. COMPTON, A.M., PH.D.

Perfect Tense.

The perfect tenses in the *passive voice* are formed by using the *perfect participle* of the verb *sum*.

The *perfect indicative* is formed by using the *perfect participle* with the present tense of *sum*, as, *sanatus sum*, I have been healed. The *pluperfect* is formed by using the *perfect participle* with the *imperfect tense* of *sum*, as, *sanatus eram*, I had been healed; and the *future perfect* is formed by using the *perfect participle* with the *future tense* of *sum*, as, *sanatus ero*, I shall have been healed.

The perfect tense in the other moods are formed in the same way by using the *perfect participle* and the corresponding tenses of *sum* as found in those moods.

The participle has an adjective use, and hence changes its ending to agree with the subject in *gender* and *number*, and takes the endings as found in the adjective *purus*, already declined as, *sanatus est*, he has been healed; *sanata est*, she has been healed; *sanatum est*, it has been healed; *sanati sunt*, they have been healed.

The perfect tense indicative of the four model verbs will be given in full, and the first person singular and plural of each of the other tenses, from which the student can readily form the other tenses, singular and plural.

1st Conj.
I have been healed.
sanatus sum, sanati sumus.
sanatus es, sanati estis.
sanatus est, sanati sunt.
3rd Conj.
I have been led.
ductus sum, ducti sumus.
ductus es, ducti estis.
ductus est, ducti sunt.

2nd Conj.
I have been mixed.
mixtus sum, mixti sumus.
mixtus es, mixti estis.
mixtus est, mixti sunt.
4th Conj.
I have been brought.
ventus sum, venti sumus.
ventus es, venti estis.
ventus est, venti sunt.

Pluperfect Tense.

1st Conj.
I had been healed.
sanatus eram, sanati eramus.
Etc., etc.
3rd Conj.
I had been led.
ductus eram, ducti eramus.
Etc., etc.

2nd Conj.
I had been mixed.
mixtus eram, mixti eramus.
Etc., etc.
4th Conj.
I had been brought.
ventus eram, venti eramus.
Etc., etc.

Future Perfect.

1st Conj.
I shall have been healed.
sanatus ero, sanati erimus.
Etc., etc.
3rd Conj.
I shall have been led.
ductus ero, ducti erimus.
Etc., etc.

2nd Conj.
I shall have been mixed.
mixtus ero, mixti erimus.
Etc., etc.
4th Conj.
I shall have been brought.
ventus ero, venti erimus.
Etc., etc.

Subjunctive Mood.

Passive.

1st Conj.
I may have been healed.
sanatus sim, sanati sumus.
sanatus sis, sanati sitis.
sanatus sit, sanati sint.
3rd Conj.
I may have been led.
ductus sim, ducti sumus.
ductus sis, ducti sitis.
ductus sit, ducti sint.

2nd Conj.
I may have been mixed.
mixtus sim, mixti sumus.
mixtus sis, mixti sitis.
mixtus sit, mixti sint.
4th Conj.
I may have been brought.
ventus sim, venti sumus.
ventus sis, venti sitis.
ventus sit, venti sint.

Pluperfect Tense.

1st Conj.
I might have been healed.
sanatus essem, sanati essemus.
sanatus esses, sanati essetis.
sanatus esset, sanati essent.
3rd Conj.
I might have been led.
ductus essem, ducti essemus.
ductus esses, ducti essetis.
ductus esset, ducti essent.

2nd Conj.
I might have been mixed.
mixtus essem, mixti essemus.
mixtus esses, mixti essetis.
mixtus esset, mixti essent.
4th Conj.
I might have been brought.
ventus essem, venti essemus.
ventus esses, venti essetis.
ventus esset, venti essent.

Imperative Mood.

Passive.

1st Conj.
Pres.—san-ari, san-amini.
Fut.—san-ator, san-antor.
3rd Conj.
Pres.—duc-ere, duc-imini.
Fut.—duc-tor, duc-untor.

2nd Conj.
Pres.—misc-ere, misc-emini.
Fut.—misc-itor, misc-untor.
4th Conj.
Pres.—misc-ire, misc-imini.
Fut.—misc-itor, misc-luntor.

Infinitive Mood.

Passive.

1st Conj.
Pres.—san-ari, to be healed.
Perf.—san-atum esse, to have been healed.
Fut.—san-atum ire, to be about to be healed.
2nd Conj.
Pres.—misc-eri, to be mixed.
Perf.—mix-tum esse, to have been mixed.
Fut.—mix-tum iri, to be about to be mixed.
3rd Conj.
Pres.—duc-eri, to be led.
Perf.—duc-tum esse, to have been led.
Fut.—duc-tum iri, to be about to be led.
4th Conj.
Pres.—ven-iri, to be brought.
Perf.—ven-tum esse, to have been brought.
Fut.—ven-tum iri, to be about to be brought.

The above completes the forms of regular verbs in the active and passive voices, excepting a few participial forms, which will be treated under the further discussion of the adjective.

The above use of *venio* may be criticised, but it is used as a model, many forms of which are met with in reading.

Exercises.—Translate, indicating where the form is found: *Sanabo, duxi, fui, miscemus, veniebam, ducibam, sana, misce, misce, duce, ducto, miscite, miscuisse, sanem, sanate, misce, pilulas, sana puerum, sanate puerum parvum, pota (drink) extractum, medicus vinum misce, puer virum aegrotum ducit.*

Translate into Latin: I shall be, he was, they were, they have been, he may be, I healed, he mixes, they lead, they come, I have healed, heal thou, mix the mass (massam), let them come, the doctor heals, the boy has mixed the mass, he may come, let him come, let them heal, to be healed, to have mixed.

VOCABULARY.

Aqua, -æ, water.
Abacus, -i, shelf; counter.
Arnica, -æ, arnica.
Apotheca, -æ, store.
Ampulla, -æ, bottle; jug.
Acetum, -i, vinegar.
Amicus, -i, friend.
Anisum, -i, anise.
Arsenicum, -i, arsenic.
Auxilium, -i, aid.
Balsamum, -i, balsam.
Benzinum, -i, benzine.
Brachium, -i, upper arm.
Bromidium, -i, bromide.
Brassica, -æ, cabbage.
Bulbus, -i, bulb.
Basis, -is, base.
Beta, -æ, beet.
Breviter, -adv., briefly.
Buchu, -i, buchu.
Caffea, -æ, coffee.
Calefactio, -is, heat.
Calidus, -a, um, hot.
Calor, -oris, heat.
Camphora, -æ, camphor.
Canis, -is, dog.
Capsicum, -i, Cayenne pepper.
Capsula, -æ, capsule.
Cares, -æ, want; lack.
Carum, -i, caraway.
Carus, -a, um, dear.
Causus, -i, cheese.
Cesso, -i, cease; stop.
Cholico, -2, check, restrain.
Colo, -i, filter; strain.
Decanto, -i, decant.
Decoquo, -3, cook down; boil away.
Degusto, -i, taste.
Deinde, -adv., then.
Demonstro, -i, show.
Depuro, -i, purify.
Desico, -i, dry.
Desugmentatus, -a, um, clarified.
Distillatio, -i, distill.
Distillatus, -a, um, distilled.
Dico, -2, speak.
Dilutus, -a, um, dilute.
Discipulus, -i, pupil.
Divido, -2, divide.
Decedo, -2, teach.
Dominus, -i, master; proprietor.
Duo, -æ, o, two.
E or ex, prep. with abl., from.
Effervesco, -3, effervesce.
Emollio, -4, soften.
Emplastrum, -i, plaster.
Erro, -i, err.
Krudio, -4, instruct.
Fabrico, -i, make.
Farina, -æ, flour.
Fascia, -æ, bandage.
Ferrum, -i, iron.
Filia, -æ, daughter.
Filius, -i, son.
Glycerhiza, -æ, licorice.
Gramum, -i, grain.
Gusto, -i, taste.
Gutta, -æ, drop.
Herba, -æ, herb.
Humecto, -i, moisten.
Impedo, -4, hinder.
Impero, -i, order.
Implico, -2, fill.
In, prep. with acc. and abl.
Intro, -i, in.
Infirmitas, -a, um, infirm; weak.
Initium, -i, beginning.
Inspecto, -i, inspect; examine.
Inter, prep. with acc., between.
Interrogo, -i, question.
Ita, adv., thus so.
Item, adv., also, likewise.
Jam, adv., now.
Jubeo, -2, order.
Justice, -a, um, just, right.
Lactuca, -æ, lettuce.
Lamina, -æ, blade.
Lappa, -æ, burdock.
Laudo, -i, praise.
Lavo, -i, wash. Lath.

Lentus, -a, -um, sticky, tough.
 Levo-, -i, lighten, relieve.
 Libellus, -i, a list, small writing.
 Libra, -æ, balance.
 Ligneus, -a, -um, wooden.
 Longus, -a, -um, long, tedious.
 Magister, -tri, master, teacher.
 Magnus, -a, -um, large, great.
 Malum, -i, apple.
 Malus, -a, -um, bad, evil.
 Matur-, -i, mature, ripe.
 Mentha, -æ, mint.
 Mistura, -æ, mixture.
 Mola, -æ, mill.
 Muto-, -i, change.
 Narro-, -i, tell, narrate.
 Novus, -a, -um, new.
 Numero-, -i, count, number.

Oculus, -i, eye.
 Officina, -æ, office, shop.
 Ordino-, -i, set in order.
 Paro-, -i, prepare.
 Parvus, -a, -um, small, little.
 Pasta, -æ, paste.
 Pavlo-, -i, tremble, fear greatly.
 Pecunia, -æ, money.
 Penso-, -i, weigh.
 Pensum, -i, lesson, task.
 Per, prep. with acc. through.
 Perculo-, -i, strain, filter.
 Peritus, -a, -um, skilled.
 Permisco-, -2, mix thoroughly.
 Phiala, -æ, phial, vial.
 Phlegma, -s, phlegm, lazy, slow.
 Pillula, -æ, pill.
 Pono-, -3, place, put.
 Porto-, -i, carry.
 Poto-, -i, drink.
 Prespero-, -i, prepare.
 Prescriptum, -i, prescription.
 Pro, prep. with abl. before, for.
 Puella, -æ, girl.

Puer-, -i, boy.
 Pulcher, -a, -um, beautiful.
 Puto-, -i, think, suppose.
 Quare, adv. why.
 Que, conj. enclitic, and.
 Quia, conj. because.
 Quo, adv. where, in order that.
 Quondam, adv. once, formerly.
 Quot, adv. how many.
 Quotidie, adv. daily.
 Quoties, adv. and conj. when, since.
 Radio, -3, shave, scrape.
 Rapum-, -i, turnip.
 Rarus, -a, -um, rare, thin, porous.
 Rectio-, -i, rectify.
 Recordor-, -i, recall, recollect.
 Recte, adv., rightly.
 Rectus, -a, -um, right.
 Recupero-, -i, recover, regain.
 Reddo-, -3, return, yield.
 Redo-, -3, rule.
 Remedium, -i, remedy.
 Residuum, -i, residue, remainder.
 Resina, -æ, resin.
 Rheum-, -ol, rhubarb.
 Rogo-, -i, ask, request.
 Rotundus, -a, -um, round.
 Ruber, -bra, -um, red.

Sacer, -a, -um, sacred.
 Sæpe, adv., often.
 Salve, -ete, good morning.
 Scindam-, -i, cut.
 Scilla, -æ, squill.
 Sed, conj. but.
 Sero-, -i, separate.
 Serus, -a, -um, late.
 Servus, -i, servant.
 Si, conj. if.
 Sic, adv. so, thus.
 Solvo-, -3, loosen, dissolve.
 Somnus, -i, sleep.
 Spatula, -æ, ladle, blade.

Sub, prep. with acc. and abl., near, towards, under, beneath.
 Super, prep. with acc. and abl., over, on, upon, concerning.
 Tabacum, -i, tobacco.
 Tam, adv. so.
 Tandiū, adv. so long.
 Tandem, adv. at length, at last.
 Tamen, adv. but, yet still.
 Taraxacum, -i, dandelion.
 Tapidus, -a, -um, tepid, warm.
 Thea, -æ, tea.
 Tolu, indecl. Tolu.
 Trutina, -æ, balance.
 Tum, adv. then, again.
 Typhus, -i, typhus fever.

Ubi, adv. where, when.
 Uimur-, -i, elm tree.
 Exercises: Puer aquam colat. Puella malum parvum habet. Canis casium degustavit. Puer piger pensum longum preparabit quotidie. Vir vasum magnum in abaco ponit. Quare pavitavit? Dominus servum laudaverat. Servus capscium gustavit. Dominus malus percolabit, et prescripta inspectabit. Medicus peritus guttas duas camphoræ jubebit. Desicca caffeam. Lava fasciam. Mistura rubra est pulchra. Recita pensum. Puer piger pensum recitat et recordatur prescriptum.
 Translate into Latin: He examines the wound. The doctor counts the money. He has tasted the mixture. Show him (illic) the lesson. Prepare the bandage. He often praised the remedy. The boy washed the shelf, daily. The dog wants the master. The lazy servant at length purified the mixture. The doctor will examine the list. Mix the vinegar and the benzin. Strain the buchu. Distill the water and decant the wine. Let the boy recite the lesson.

Uncia, -æ, ounce.
 Ut, conj. and adv. that, how.
 Just as.
 Uva, -æ, bunch of grapes.
 Vasum, -i, vessel.
 Vel, conj. or.
 Vena, -æ, vein.
 Verus, -a, -um, true.
 Vinum, -i, wine.
 Vir-, -i, man, hero.
 Vivo-, -3, live.
 Voco-, -i, call, summon.
 Vulnus, -i, wound.
 Vulnus, -eri, wound, hurt.
 Xanthoxylum, -i, prickly ash.
 Xylobalsamum, -i, balsam wood.
 Zedaria, -æ, zedary.

NOTICE TO STUDENTS.

Students should send their written replies to the questions on the lectures to the Director, Prof. J. H. Beal, Scio, O., and not to the publishers. A strict observance of the rules sent out with the recitation blanks is requested. Students should read these rules carefully before attempting to write their answers.

FINAL EXAMINATIONS.*

By L. E. SAYRE.

Query.—There is a tendency in some educational institutions to eliminate the final examinations, or to make them optional for students who attain a satisfactory average rating throughout the term. Is such a method desirable or applicable to the course of instruction presented by the schools of pharmacy?

The value of examinations may be viewed from at least three different standpoints: Its value to students, to instructors, and to the State.

To the Student.—No one will question, perhaps, the value of examinations as a part of the class-room work. This advantage, in spite of his disavowal, is experienced by the student himself. It is from students, however, much of the opposition comes. The student needs, for his own development, such peculiar help as the examination furnishes. He needs to be brought frequently to a test of his ability, to be brought face to face with a record which he makes himself of his mental strength and capacity. Purely as a mental exercise it is to him of immense value.

To the Instructor.—The value of an examination to the instructor is probably not so great. It is unquestionably some help as a means of verifying his estimate of the student, although he, in many cases, especially in small classes, knows the mental capacity of his pupil pretty thoroughly. Still for the sake of the general good of the class, and for stimulating to work it is an important factor, if properly used. A prominent instructor, in answer to a question relating to this subject, said: "About 25 to 30 per cent. of my students will not work unless they have constantly before them an examination to prepare for." But no one realizes more than the instructor that working for examinations merely tends to develop superficiality, to strengthen the rote-

faculties and to weaken the reasoning faculties. Unless he use this excellent means of instruction according to the principles of what is now termed the "science of examination," he trains the student to cleverly skim the subject and engenders an incapacity for original work. A desire to appear to know rather than to know, and a belief in artifices and formulated answers is the bane of the misuse of this department of class-room work. All this the instructor has constantly before him—experience has taught him the actual value of examinations, and he uses them accordingly.

To the State.—To the legal body which stands between the community and the college—to the State, in other words—documentary evidence such as is furnished by examinations is of unquestionable value, as it presents to this body—what may be read between the lines—a certified statement of peculiar value. Without this documentary evidence, over the student's own signature, both the college and the State would place themselves in a peculiar position with reference to the community, exposing themselves unduly to its fault-finding members, and to the same class among the students, who are always ready to bring up the accusation of favoritism.

The value of final examinations.—The final examination has advantages peculiar to itself. What applies to the ordinary recitation, to the quiz and periodical review, applies in some measure also to final examinations.

Final examinations not only serve to separate the drones from the workers, the competent from the incompetent, but they serve as an important safeguard against the facile and treacherous memory of the student who accomplishes the daily task easily and makes excellent records on recitations, but who does not retain and accumulate, and who so remains unable to command even the essentials of a whole subject. The fact that the final examination confronts the student tends to keep him from forming the habit of this superficial kind of study, and the examination catches those who have such a fatal fault.

But it is the documentary evidence referred to—the

* Read at the annual meeting of the A. Ph. A., 1898.

certified statement—which more than any other quality characterizes the final examination.

I have yet to see a candidate for a college certificate who was not in his own mind satisfied that he should pass, that he had ability enough to merit the honors the college bestowed upon its graduates. But, as we all know, there is almost always a certain number who are very much deceived about their own ability and acquirement, and who in the judgment of their instructors are in no wise competent or qualified. Such students are not satisfied with the instructor's or examiner's estimate, have no conviction of its justice, and need to be confronted with proof. This a final examination gives.

Now, as to those who have a satisfactory rating throughout the year or term, and those who are thorough and conscientious in their work. The final examination is of value to them in that its preparation allows them to grasp the subject as a whole. This, of course, was impossible before the subject was completed.

Many students, who are in the least inclined to be nervous, find that final examinations are extremely trying to them, as there is a certain excitement that accompanies them. They also find that the work in its preparation—or the result of this work—is only retained long enough to pass the examination. This, of course, might be applied to all students.

In consideration of this latter point some modification might be preferable. One University has a system of reviews which take up the time of a daily recitation or lecture, or may extend through a week, according to the will of the instructor. This system of reviews aims to be as comprehensive as the work required for the preparation of a final examination. The students are not informed beforehand whether they are to be examined or whether they are to go on with the regular recitation or lecture. This, of course, necessitates a thorough preparation constantly, as no student would dare to take the risk of being unprepared for any emergency.

Such a system doubtless can be improved upon, and it is to be hoped that in some future time a plan may be devised which will relieve the student and the instructor.

SULPHUR PRODUCTION IN POLAND.—A company has been formed in Moscow for the extraction of sulphur from the ores of Czarkowsky by a new process devised by Platanoff, which is both simple and cheap. The ore is placed in an apparatus that can be hermetically closed, the apparatus then filled with water, and after closing heated with steam. The sulphur separates and falls through a sieve or filter into a receptacle in which it solidifies. The extracted ore remains in the upper part of the apparatus. Eight plants of this kind have thus far been erected. The sulphur so obtained is very pure and the cost of extraction is only one-half that by the old methods. It is expected that Russian sulphur will compete successfully with the Sicilian product. (Drog. Ztg.)

COMPOUNDS OF NAPHTHOL AND EUCALYPTOL.—Naphthol (alpha or beta) and eucalyptol are heated together in molecular proportions until fused. The crystalline mass, which is formed on cooling, is again fused in presence of hot water to remove soluble impurities. The product is insoluble in water, soluble in the customary organic solvents, further in olive oil and in hot glycerin, from which latter it separates on cooling in form of beautiful needles. The melting point is not well defined. Above 40° C. it softens and melts at 65° to a nontransparent mass, which becomes entirely clear at 73° to 75°. (Südd. Ap. Ztg.)

STAPLE LEMON JUICE may be prepared, according to Pharm. Rundschau, in the following manner: The strained juice is mixed with one-fourth its quantity of powdered talcum, shaken with it frequently during one hour, and then filtered. To the filtrate one-tenth of its weight of sugar is added, the mixture brought to boiling and while boiling hot filled into bottles, which have just previously been immersed in boiling water. The bottles are closed with paraffined corks. So prepared, the juice is said to keep indefinitely.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Resinol.

(E. R. W.) See this journal, February 3, 1898, page 174.

Filtering Cod Liver Oil.

(E. R. W.) It is possible your sample of cod liver oil may be "cleared" up by filtering it through fuller's earth or some similar filtering medium. Try it.

Quassia Cups.

(E. J. H.) Quassia cups in either tumbler or goblet shape (large or small) may be obtained from almost any wholesale druggist. Address any of the following jobbers: McKesson & Robbins, New York City; Schieffelin & Co., New York City; Morrison, Plummer & Co., Chicago; Robert Stevenson & Co., Chicago.

Cough Syrup.

(J. H. W.) A precipitation, though not very serious is likely to occur upon allowing the following mixture to stand for a short time:

Syrup senega,
Syrup ipecac,
Syrup tolu,
Camphorated tincture of opium, of
each, equal parts.

Syrup of senega, made by the official process, contains some ammonia added to render the syrup transparent; while syrup of ipecac is slightly acid from the acetic acid added to dissolve the emetine. When these syrups are mixed the ammonia is neutralized and the mixture becomes cloudy. The camphorated tincture of opium is also rendered cloudy by admixture with the syrups. The addition of glycerin will retard these reactions, though it does not entirely prevent them.

A Shot-Gun Combination.

(W. M. L. W.) asks what we think of the following prescription:

Syr. white pine bark.....	min. 80
" wild cherry bark.....	" 40
" scilla root.....	" 48
" senega root.....	" 48
" ipecac.....	" 32
" blood root.....	" 16
Tr. opl. camph.	3 1/2
Chloroform pur.....	min. 80
Oil gaultherie.....	min. 32
Terebene.....	min. 5j

The above is a type of those "shot-gun" combinations sometimes met with in dispensing pharmacy. At best nothing but a "shake" mixture can be prepared from it and the chief point of criticism to be made against such a procedure is that the doses of chloroform, oil of wintergreen and terebene cannot be evenly adjusted. The prescriber's style of writing and spelling is not to be commended. The directions to the patient are not given.

Flavoring for Soda Water or "Pop."

(T. O. M.) Various flavors are used, principally lemon and sarsaparilla. For the first a lemon syrup is made as follows: simple syrup 1 gallon; extract of lemon, half an ounce; fruit acid 1 ounce. For sarsaparilla syrup the following is the formula: Oil of anise 15 drops; oil of wintergreen 15 drops; oil of sassafras 15 drops; fluid extract sarsaparilla 2 ounces; simple syrup 3 pints; extract of licorice half an ounce. A sufficiency of the syrup is mixed with water, and the whole then charged with carbonic acid gas. A so-called "sarsaparilla extract" containing no sarsaparilla may be prepared as follows:

Oil of wintergreen.....	6 drams
Oil of sassafras.....	3 drams
Oil of cassia.....	1 1/2 drams
Oil of cloves.....	1 1/2 drams
Oil of anise.....	1 1/2 drams
Alcohol, deodorized, enough to make.....	16 ounces

"Fruit acid" is usually made by dissolving 5 ounces of

citric acid in enough water to make the solution measure one pint. It should be made only as wanted, as it is extremely liable to spoil. Sometimes alcohol (about 2 ounces to the pint) is added to preserve it.

Dorsey's Solution.

(C. A. D.) We know of no formula under this specific title. Some years ago the following was contributed to this journal for "Dorsey's Mixture":

Saturated solution of magnesium sulphate 4 ounces
Aromatic sulphuric acid 2 fl. drams
Mix, used in the treatment of dysentery.

A formula for a mixture of an entirely different character has been published under the same title. It follows:

Hydrastin 5 grains
Tincture of myrrh 2 drams
Water, enough to make 8 ounces

Recommended as an injection in the treatment of gonorrhoea.

Just how either of these formulas came to be ascribed to "Dorsey" we are unable to trace. Both have been used by various practitioners for years, the first in particular being a well known combination prescribed in the treatment of acute dysentery of a sthenic type, magnesium sulphate having a decided influence in lessening the tormina, tenesmus and mucous stools, and reducing the febrile action. Aromatic sulphuric acid is also frequently added to solutions of magnesium sulphate to disguise the nauseating and bitter taste.

A comparison of the above formulas under the same title shows very plainly the danger of prescribing medicines under names which give no clue to the identity of the preparations wanted. It leaves the druggist wholly in the dark and may lead to serious if not fatal accidents.

Effects of Saltpetre and Salt on the Hands.

(Phm. B.) says the packers of meat in his neighborhood are badly troubled with "burns" caused by the saltpetre and salt used in packing getting into the cracks or scratches on their hands. He says the saltpetre "eats into the bone" and makes very bad sores. Various ointments, carron oil, etc., have been tried as remedies. He asks if there is any solution which may be painted on the hands and not interfere with the packers' work. What other treatment can be suggested? We cannot suggest any satisfactory solution to be used as a paint. It is possible that the cuticle may be somewhat toughened by the application of a solution or ointment containing some astringent principle or substance, but whether the application of this idea would be practicable, remains to be demonstrated by experiment. Saltpetre is a very strong local irritant and stimulant and so long as it is allowed to come in contact with the raw surface of the flesh there is likely to be trouble. The only really effective method would be for the packers to allow their hands to become thoroughly healed before continuing their duties. This suggestion is hardly likely to be followed by the packers and the next best thing will be to instruct them in the art of taking care of their hands. Some ointment like the following old-fashioned stick salve may be used to heal up the cracks in the hands, which should be first thoroughly washed clean and dried:

Rosin 1 pound
Mutton tallow 1 ounce
Beeswax 1 ounce
Burgundy pitch, of each 1 ounce
Balsam of fir 1 ounce
Venice turpentine, of each ½ ounce
Oil origanum 1 dram
Oil wormwood, of each 1 dram
Camphor, powdered 1 dram

Melt the rosin, tallow, beeswax and pitch together; when the mixture is a little cool add the oils and powdered camphor and poured into cold water; then, by greasing the hands, the mixture may be pulled and worked until it is intimately mixed; it is then rolled into sticks. This salve is said to adhere to the skin and is not readily washed off by water. The further application of dressings containing tannic acid or other astringent to harden the cuticle may be recommended.

Cider Preservatives.

(C. G. E.) Salicylic acid, bisulphite of lime, formalin and various other preservatives have been recommended for the preservation of cider. Of the first named about 1½

ounces are required for 50 gallons of cider. A so-called "calcium sulphite" is on the market in packages just the size for one barrel of cider (32 gallons.)

To "preserve" with salicylic acid: Place the acid in some suitable container and pour upon it a sufficient quantity of cider and thoroughly mix before adding it to the contents of the barrel. If the acid be added directly to the cider in the barrel, it is very likely to float upon the top and not be dissolved. It should be dissolved in a little alcohol and added to the barrel. The time when this addition should be made depends on individual taste and circumstances, generally just when the first fermentation is completed. As the cider runs from the press pass it through a hair sieve into a large open vessel. In a day or less the pomace will rise to the top, and in a short time becomes very thick. When little white bubbles break through it, draw off the cider through a spigot placed about 3 inches from the bottom. At this stage the acid may be added.

Another method, and one largely followed, is at this point to transfer the cider to clean, sweet casks, and when the bubbles again escape at the bung-hole, rack it again; repeat this a couple of times. Then fill up the cask with cider in every respect just like that originally contained in it, add a tumbler of warm sweet oil, and bung up tight. For very fine cider it is customary to add at this stage about ½ lb glucose, or a smaller portion of white sugar. The cask should then be allowed to remain in a cool place till the cider has acquired the desired flavor. In the mean time clean barrels for its reception should be prepared as follows: Some clean strips of rags are dipped in melted sulphur, lighted and burned in the bung-hole, the sulphur vapor being retained in the barrel. Then tie ½ lb mustard seed in a coarse muslin bag, and put it in the barrel, fill the barrel with cider, and add about ¼ lb isinglass or fine gelatine dissolved in hot water. This is an old-fashioned but very satisfactory method.

Other old-fashioned, though frequently used processes, are the following:

(1.) Place in each barrel immediately on making, 4 oz. mustard; salt, 1 oz.; chalk, 1 oz.

(2.) Mustard seed, 1 oz.; allspice, 1 oz.; olive oil, 4 oz. and alcohol, 8 oz.

(3.) To keep cider sweet: When it has reached the flavor required, add 1 to 2 tumblers of grated horse-radish to each barrel of cider.

The addition of bismuth subnitrate has been recommended to retard the formation of free acid (souring) in cider. For some interesting details of experiments along this line, see this journal, February 3, 1898, page 173.

Purification of Water.

(N. H. D.) Sodium fluoride is used to considerable extent for the purification of water. In a paper read before the Wisconsin Pharmaceutical Association some years ago, A. Wageman claimed that when it was added to water it was superior to alum for removing impurities, calcium and magnesium salts, organic matter and noxious bacteria. He also recommended this treatment for water tainted with sewage, claiming that it was the only substance known which would actually prevent the formation of scales in boilers. Its action is based on the fact that it precipitates the alkaline earths in the form of an innocuous soft mud which does not adhere to the boiler. For this purpose the amount varies with the composition of the water, from an ounce to each 1,000 gallons upward being necessary.

Calcium permanganate has also been employed as a chemical means of purifying drinking water and it is claimed (Bordas and Glard, Comptes rend.) to be a more powerful oxidizing agent than potassium permanganate and has the further advantage of not contaminating the water with mineral matter. The carbonic acid produced during the oxidation liberates permanganic acid from the salt, and so quickens the destruction of the rest of the organic matter. In practice they say it is necessary to employ an excess of permanganate, which is removed by the lower oxides of manganese, by which it is transformed into manganese dioxide. The following reactions take place: (1) Decomposition of calcium permanganate in presence of organic matter, with formation of calcium carbonate and manganese oxides; (2) oxidation in the mixture of lower manganese oxides and carbon (added

to agglomerate them) at the expense of the permanganate; (3) slow reduction of the manganese peroxides thus formed by organic matter or by the carbon. These investigators reported that waters which were colored after the above treatment, became colorless when exposed to air for 24 hours, depositing a brown gelatinous substance, a manganous manganic oxide, which appears to be soluble when first formed; the water is then free from organic matter, and contains only very little calcium carbonate and traces of hydrogen peroxide.

Alum and aluminum sulphate are extensively used in water purification for dyeing purposes and may answer for water used in the laundry. The aluminum sulphate, if added to a water in suitable quantity, is said to be completely eliminated by combining and separating with the impurities. Another process recommended consists in adding to the water a mixture of four parts sodium bicarbonate, four parts calcined soda and 4 parts of a solution of sodium silicate. The mixture should stand for twenty-four hours, when it generally becomes hard, so that it can be rubbed to a powder; 2 to 3 pounds of the mixture will generally soften 50 gallons of hot water.

In this journal, July 1, 1893, page 11, were described several methods for purifying drinking water in which iron filings, alum, ferrous sulphate, etc., were employed.

Compound Syrup of Hypophosphites.

(A. T.) The details of the process of the National Formulary for the preparation of compound syrup of hypophosphites are not adapted to the incomplete and imperfect formula you submit. The syrup made by the N. F. process is not intended to be perfectly clear, specific instructions being given to always shake the syrup before using (see footnote, N. F., revised edition, a work which you should possess). That your formula is incomplete and imperfect it is but necessary to note the quantities of the hypophosphites of calcium, potassium and sodium employed, that of the first named calling for but 16 grains in a pint of the final product. A "clear" syrup containing the substances you name may be made after the following formula, recommended by the British Pharmaceutical Conference:

Quinine, alkaloid	20 grains
Strychnine, alkaloid	1 grain
Hypophosphorous acid, 30 p. c.	2 drams
Strong solution hypophosphite of iron, B. P. C.	3 ounces
Dissolve, and add	
Hypophosphite of calcium	80 grains
Hypophosphite of manganese	40 grains
Hypophosphite of potassium	40 grains
Dissolve, filter, and add	
Syrup to	20 ounces

The addition of sodium hypophosphite and the substitution of a small quantity (from 2 to 4 ounces) of glycerine for part of the syrup have been recommended. The strong solution of hypophosphite of iron, B. P. C., used in the above, is prepared as follows:

Sulphate of iron	.760 grains
Barium hypophosphite (95 per cent)	830 grains
Dilute sulphuric acid	100 minims
Distilled water	20 ounces

Put the sulphate of iron with 5 ounces of distilled water in a tall 24 oz. bottle and shake till dissolved. Dissolve the hypophosphite of barium in the remaining 15 ounces of water and add slowly to the former solution; shake and add the dilute sulphuric acid; again shake and set aside for two days, then siphon off the clear liquid. Keep in bottles quite full. Iron hypophosphite is a very difficult salt to dissolve and the use of this solution enables the operator to add the desired quantity directly to the mixture without further trouble.

One cannot pretend to give the working formulas of the various syrups of this character put up by manufacturers. Their products differ widely in appearance because of the different formulas and processes employed. The white appearance of some of them is no doubt due to the absence of iron hypophosphite. Others again contain such a small quantity of it that the syrup is scarcely colored. The syrup containing it may become darker by exposure to light. All of these possible conditions are likely to influence the appearance of the finished product of any one's make.

A formula for preparation containing glycerine and said to be very clear and bright may be found in this journal, March 17, 1897, page 402.

Etching on Steel.

(R. L. B.) Nitric or hydrochloric acids or mixtures of the two are employed as the "acid" in marking or etching on steel. The following are among the methods employed:

(1) Glacial acetic acid	4 parts
Absolute alcohol	1 part
Nitric acid (sp. gr. 1.28)	1 part

Allow the acetic acid and alcohol to remain for half an hour, then add nitric acid carefully. Etch from one to fifteen minutes. Of course the parts you wish to protect from corrosion must be covered with beeswax, tallow or similar substance.

(2)—Cover the surface with a thin coat of asphaltum varnish of fine quality, then cut the design through to the surface of the steel and etch with a weak solution of nitric acid in water; finally wash with hot water and remove the asphaltum with hot turpentine.

(3)—Clean the steel and cover evenly with wax, cut the lines with a steel point through the wax and pour on the following etching fluid: Pyrolineous acid, 4 ounces; alcohol, 1 ounce; nitric acid, 1 ounce, by measure. Or use iodine, 1 ounce; iron filings, $\frac{1}{2}$ dram; water, 4 ounces. Etching fluid is removed as soon as the metal is sufficiently etched.

Etching on Cutlery, Etc.—1. For etching on cutlery a ground wax is required, composed of equal parts of asphaltum, Burgundy pitch and beeswax, melted together and thoroughly incorporated. In applying it use a dabber, or ball of cotton covered with silk. Warm the piece of cutlery so that a stick of the wax will readily melt by touching. Smear a small quantity of the wax on the blade or articles, and dab it evenly all over the surface. When cold, scratch the required design or name on the surface and touch the parts with acid (nitric acid 1 part, water 4 to 6 parts), using a camel's hair pencil to cover the surface and bring the acid into contact with all the lines. In a few minutes the biting is done. Dip in hot water to wash off the acid, and the surface may be cleaned by wiping with benzine. Another way is to make a varnish of asphalt and turpentine, with a few drops of linseed oil to make it tacky. Have a rubber stamp made of the required design, with a border, so as to stop off around the design. Stamp the goods, and with some of the varnish thinned down with turpentine and a brush stop off the surrounding parts; or surround the design with a small rim of beeswax, and apply the acid as above.

2.—For etching brands and marks on polished steel surfaces, such as saws, knife blades, and tools, where there are many places to be done alike, procure a rubber stamp with the required design made so that the letters and figures that are to be bitten by the acid shall be depressed in the stamp. Have a plain border around the design, large enough to allow a little border of common putty to be laid around the edge of the stamped design to receive the acid. For ink, use resin, lard oil, turpentine and lampblack. To $\frac{1}{4}$ pound of resin put 1 teaspoonful lard oil; melt, and stir in a tablespoonful of lampblack; thoroughly mix, and add enough turpentine to make it of the consistency of printer's ink when cold. Use this on the stamp in the same manner as when stamping with ink. When the plate is stamped, place a little border of common putty around and on the edge of the stamped ground. Then pour within the border enough acid mixed to cover the figure, and let it stand a few moments according to the depth required, then pour the acid off. Rinse the surface with clean water; take off the putty border, and clean off the ink with turpentine. Use care not to spill the acid over the polished part of the article. For the acid use 1 part nitric acid, 1 part hydrochloric acid, to 10 parts water by measure. If the effervescence seems too active, add more water.

Another etching liquid recently recommended in Jeweler's Circular is the following: Mix 1 ounce copper sulphate, $\frac{1}{4}$ ounce alum, $\frac{1}{2}$ dram common salt reduced to powder, with 4 ounces of vinegar, and 20 drops of nitric acid. This liquid may be used either for etching deeply into the metal or for imparting a beautiful frosted appearance to the surface, according to the time it is allowed to act. Protect the surface surrounding that to be etched with beeswax or paraffin.

A LONG YEAR.

Subscribe for the Era now and have your year's subscription date from January 1, 1899. The remaining issues of this year are free. See first editorial page.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission

Vol. XX.

NEW YORK, OCTOBER 27, 1898.

No. 17.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER.

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York,
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - \$3.00 per annum
Foreign Countries in Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483,
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 104 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL..... 357	Think of It: Newton's
CORRESPONDENCE..... 357	Turn Now: Texas Drug
Therapeutical Economics	Company Out..... 377
of Open Composition..... 569	To the Druggists of the
ERA COURSE IN PHAR-	U. S. and Canada: So-
MACY..... 561	ciety Chemical Industry;
Inorganic Chemistry..... 561	Jersey City Druggists'
Pharmaceutical Physics..... 563	Association..... 578
Official Preparations..... 563	New York College Quar-
Pharmaceutical Latin..... 567	terly Meeting: Drug
Patent and Proprietary	Trade Bowling Tourna-
Medicines in Foreign	ment..... 579
Countries..... 569	NEWS LETTERS..... 579
Petition to Repeal Stamp	ASSOCIATIONS, BOARDS
Tax Law..... 570	AND COLLEGES..... 584
Study of Materia Medica	BUSINESS RECORD..... 585
and Therapeutics..... 571	BOOK REVIEWS..... 585
QUESTION BOX..... 573	Report N. W. D. & Co.
PHARMACY..... 574	Committee on Drug Market.
NEWS AND TRADE DE-	OBITUARY..... 589
PARTMENT..... 577	PATENTS..... 589
New rulings on Propri-	Here and There..... 590
etary Tax: What They	STATE OF TRADE..... 591
	MARKET REPORTS..... 592

SPECIAL SUBSCRIPTION OFFER.

At no time within the history of the drug trade have there been so many important events transpiring and likely to occur as at the present time. Questions are being discussed which vitally affect the well-being of the trade. Now, if ever, the druggist needs to keep in closest touch with events which concern him, and no agency so well fulfills this purpose as the pharmaceutical journal which is issued frequently enough to give him news when it is news, and to inform him of occurrences and anticipated events early enough for him to profit from them. Such a journal is the Pharmaceutical Era, and its advantage in being issued weekly is shared by no other pharmaceutical publication. Readers of the Era do not have to wait a fortnight or month for important news of the trade. The subscription price is \$3 per year (fifty-two numbers), but in order to enlist the interest of those who are not at present subscribers, the remaining issues of this year will be given free, and the year's subscription dated from January 1st to December 31st, 1899. By promptly remitting \$3 the subscriber will thus receive sixty-two numbers for the price of fifty-two. Address D. O. Haynes & Co., Publishers, Box 1483, New York.

The Work of Associations.

The meetings of the three grand divisions of the drug trade in St. Louis last week mark about the last of such gatherings for the current year. In considering their deliberations one cannot but note what a great fellow the average American is for organization and conference. The spirit of association is in the air he breathes. He seeks advancement along certain lines: his neighbor has a like inspiration, and, lo, an association is formed. In exemplification of this idea, the pharmacist is not one whit behind his fellow citizens. That he has had lots of experience the pages of pharmaceutical journalism mutely testify. Wherever two or three pharmacists have gathered together, the tendency to attack a foe by joint or united effort has been most common; the contest, alas, has not always been crowned with victory, or even "honorable peace." The successes and failures of the various efforts at organization are a part of the history of the drug trade.

As a means to an end the association idea is a logical one, but its success, like every other basic principle of the universe, must depend upon the adjustments of economics and natural laws, too often lost sight of by those most vitally interested. Organized effort may divert the stream of naturally existent commercial conditions, but it can never entirely stop the flow. Failure to take cognizance of these fundamental principles has caused pharmacy to be strewn with the wrecks and derelicts of good intentions and high aims. Failure has also resulted because the body organic was bound together with sinews of straw. No association ever started out with higher aims than did the old National Retail Druggists' Association, organized in Washington in 1883, and yet its mission was fruitless. The Interstate Retail Druggists' League, founded in 1891 at St. Louis, marked another awakening of the retail drug trade. It failed, notwithstanding its projectors prophesied the organization could absolutely voice the sentiments of the whole country by its delegates in convention assembled. The essence of success was lacking. The membership as a whole failed to live up to its profession, organization of branch societies was not general, its development was retarded by obstruction from within and without, and, as a result, its inanimate form was early buried in oblivion. The Clampton plan was another attempt from which great things were expected, but from which no practical results were accomplished.

In striking contrast to these organizations and "plans" which have had their "little day," are those associations whose accomplishments adorn the history of the drug trade. We refer to the American Pharmaceutical and the National Wholesale Druggists' Associations. They may have made mistakes, their plans may have at times miscarried, yet, upon the whole, they have honestly endeavored to advance the interests of their membership and encouraged proper relations and the spirit of harmony between all branches of the drug trade. The various State associations, too, have done good work. Organized to

secure proper legislation to restrict the dispensing and sale of medicines to properly qualified and trained pharmacists, they marked a new era in the development of the country. They impressed upon legislative bodies the needs and desires of professional men. The primary objects of their organization were attained because there was a need for such legislation. The association had but to crystallize public opinion toward this end and the proper enactments were forthcoming. In this character of work the association has always been successful. Would it could as well solve the other problems which vex the druggist. It cannot solve them by striving to force trade into artificial channels or organizing against the conditions existing naturally as the result of economic laws.

Wanted: A Nitrogen Fixer.

A month or two ago Sir William Crookes created a flurry by delivering an address before the British Association, wherein he deftly handled statistics in a way to show that the world is soon to go hungry for bread. The exact figures in this interesting problem are: 516,500,000 bread eaters who require 2,324,000,000 bushels of wheat each year. The '97-'98 harvest only produced 1,321,000,000, leaving us shy 403,000,000 bushels, which was made up in part by some 300,000,000 bushels which we happened to have in the bin, left over from a previous year. The address has been variously commented upon, and as a coincidence it is remarked that just one hundred years ago another worthy Englishman, viewing man as an animal and forgetting about his brains, made the astonishing discovery that population increased in a geometrical and subsistence in an arithmetical ratio, from which an alarming deduction was quite obvious. The catastrophe hasn't happened yet, and perhaps the alarm of 1898 will prove equally harmless.

Sir William himself is quite optimistic, as an able and enthusiastic chemist should be. He has a remedy, but in portraying his own poverty by showing that Great Britain needs 240,000,000 bushels yearly, and must import 75 per cent. of them, he unkindly twits us about our possible poverty of the future. He says that the bread-eating world has depended and still depends upon the United States for the means of subsistence, but we have no uncultivated prairie land suitable for wheat, and within a generation we will consume all our own and be driven to import. It is true that our area of "free" land is growing quite small, but with our plenty we have been mighty prodigal and careless with what is fenced in. We can do a great deal better, almost double if necessary—better than statistics can prophesy. We've just been thinking of farming by electricity over here, and if required we can dismiss the horse and use the land necessary for his maintenance in growing wheat for the hungry European.

"That colossal problem that must tax the wits of the wisest" need trouble Sir William no longer. When we do the evening chores of the future we will see that there is enough feed to go round, and as we lock the European barn each night we shall retire with the satisfaction that there is little prospect of the stock coming out "spring-poor."

As to the remedy, Sir William says, in part: "Before we are in the grip of actual dearth the chemist will step in and postpone the day of famine. . . . Wheat pre-eminently demands nitrogen fixed in the form of ammonia or nitric acid. . . . but nitrogen is mainly of atmospheric origin and is rendered 'fixed' by a slow and precarious process. . . . Leguminous plants bear on their roots nodosities abounding in bacteria with the property of fixing atmospheric nitrogen. . . . The store of atmospheric

nitrogen is practically unlimited. . . . Every square yard of the earth's surface has nitrogen gas pressing down upon it to the extent of about seven tons. . . . The fixation of atmospheric nitrogen, therefore, is one of the greatest discoveries awaiting the ingenuity of chemists." Anticipating the solution of the problem he remarked: "Nitrogen is a combustible gas, and the reason why, when once ignited, the flame does not spread through the atmosphere and deluge the world in a sea of nitric acid is that its igniting point is higher than the temperature of its flame—not hot enough, therefore, to set fire to the adjacent mixture. But by passing a strong induction current between terminals, the air takes fire and continues to burn with a powerful flame, producing nitrous and nitric acids."

Electricity is therefore depended upon to do this great work, but it will require the cheap water power of Niagara to generate it, and with this it is estimated that nitrate of soda may be produced for less than \$25 per ton. This solution of the problem is quite gratifying. We already have Niagara harnessed up, and with our peculiar North American atmosphere composed of nitrogen, ozone and ginger, we stand before unlimited possibilities. But hold! There are other scientists who predict the failure of Niagara! The Great Lakes are said to be shrinking in area and the underpinning of the falls is gradually wearing away. However, our chemists are still left to us, and we bespeak their kindly attention and interest. Some simple scheme is wanted so that every man, however humble, may become his own nitrogen fixer. Here is a problem worthy of the steel of the young and aspiring chemist. We say young, because the old fellows will too quickly say it can't be done.

The Inevitable Committee.

There is no denying the fact that there is a peculiar phase of American public life which has subjected us to much international criticism. Our only comfort is that our departure from the conventional deserves that veneration which is due to age. This weak point of ours has been traced back by historians, whose veracity is not now under examination, as far as 1600 or thereabouts, to the incident in which one of the original Smiths and Pocahontas figure most brilliantly. It is related, with some unfortunate reservations as to authenticity, that as the preliminary hearing of the redoubtable Capt. John was about concluded, Powhatan made a remark which has come echoing down the ages. As if it were a matter of habit, so the chroniclers read, he glanced over the dusky, coppery assemblage, and winking his left eye at Pocahontas, said: "We will now refer the matter to a committee of three."

Age has not staled nor custom withered this practice inherited from the aborigines. When in convention assembled, we still refer things of moment, whether they be congressional, pharmaceutical or festival, to the inevitable committee. The distinguished foreigner or traveling journalist who wonderingly beholds this strange practice forthwith returns to his native shores, and whether his favorite expetitive (as concerns us) be "blawsted," "donnerwetter" or "caramba," he concludes his remarks with the significant information that "they refer things to committees."

We are duly exercised over this evidence of our crudeness. When our worthy presidents or members of A. Ph. A.'s or N. W. D. A.'s make this time-honored remark, we can fancy the hot breath of criticism blowing upon our fevered brows, and our over-wrought nerves tingle unpleasantly. We have, all along, had a sneaking idea that this practice was necessary to

prevent some of our respected, convention-attending citizens from talking themselves (or others) to death upon the floor; or that it might be a wholesome measure to prevent alarming infractions of settled rules of order. This explanation has not, however, been satisfactory, and we have wearily waited for the true solution. Our patience and fortitude are at last rewarded. We find a glittering ray of light emanating from a recent article in McClure's, by William Allen White, author of "What's the Matter with Kansas?" "Boyville Stories," etc. Let us compose ourselves while we read what he says:

"Democracy is vital. Perhaps it is the only growing idea. No one has defined it. Great minds have expressed something of its meaning. Their thoughts tally with some rhythm that pulses through the soul of things. Heaven that directs it only knows what it is, this Democracy. Men know that it makes nations virile, tunes their songs in a major key, makes men fight with their hands instead of with knives and poison. And more than these things, Democracy impels men, whether they are building highways or universities, or whether they are forming international policies or circumscribing the peregrinations of the town cow, to transact business through the agency of committees."

Could anything be more apropos in our present extremity? Democracy is the very opposite of aristocracy and mugwumpery. It is as evident as the nose of Cyrano that the country which does not refer things to the inevitable committee, must be one of these anathemes of democracy. Should there be doubts about this; should there be further cavil, jeering, pointing of the finger of scorn, etc., we shall be compelled in sheer desperation to have a committee pass upon the matter.

A Postal Cheque for Small Remittances.

A project which has received considerable discussion among publishers and others whose business requires the transmission of a large number of small amounts of money through the mails, is that of the Post Cheque system of remittance. The present money order system is admittedly cumbersome and inconvenient in its necessity for personal application for the order and subsequent bother to the payee. The Post Cheque system is intended to replace the convenience which was lost through the retirement of our fractional paper currency, and to obviate the difficulty of sending silver coin through the mail.

It is suggested that the Post Cheques be issued in 5, 10, 25 and 50 cent and in \$1, \$2 and \$5 notes, their backs to be printed in the usual designs for Government currency, and their faces in a similar style prominently indicating the denomination of the note, with blank spaces for certain entries to be written by the remitter. To make use of these the sender would take the required denominations to make up the required remittance, the blank notes being purchased at post offices in such quantities as might be required. The name and the address of the payee are then written in the blank spaces, a two cent stamp is affixed and the remitter's signature is written in a way to cancel the stamp. The cheque is then enclosed in a letter and can be used only upon proper endorsement by the payee.

This looks like such a good thing for everybody that it will probably meet the usual opposition that all good things meet, when legislation has to bring them into being. But we understand that the American Newspaper Association is to formulate a bill to be presented to the next Congress, and should the matter progress so far, there will doubtless be occasion to repeat the usual advice to "write your Congressman" about it.

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

DO NOT WANT THE CALENDARS

Burlington, Vt., Oct. 16, 1898.

To the Editor:—Among the list of patriotic (?) patent medicine men we find the name of C. I. Hood, of Sarsaparilla fame, who like many others, not content with being sufficiently reimbursed for the war tax, adds forty-five cents per dozen over and above cost of stamps, probably as a remuneration for the trouble of affixing them.

Out he comes this fall with his liberal calendar offer, fifty calendars for one-quarter dozen. In years past it was fifty calendars for one dozen. Does this mean the calendars are cheaper, or is he seeking for more free counter distribution? Whichever it may be, you will always find him on the long end of the rope.

But supposing the entire army of druggists would refuse this offer, what would Mr. Hood do with his calendars? He might convert them into fuel on some cold day, or perhaps retain them as souvenirs of his subscription to the Spanish-American war fund.

My point, Mr. Editor, is to persuade every druggist to reject this offer; not handle the calendars; place Hood's medicines out of sight as there are other goods just as salable and which pay better profits.

Let us unite, and convince Mr. Hood that he is not the only bonnet.

Sincerely yours,
WORMWOOD.

Eldorado, O., Oct. 17, 1898.

To the Editor.—I am heartily in accord with the ideas expressed in Messrs. Mitchell & Scudamore's letter, published in the Era of the 13th inst.

About two weeks ago I received Messrs. C. I. Hood & Co.'s Calendar Offer. I immediately replied, refusing to accept the offer and stating that I would endeavor to retard the sale of their preparations as much as possible, unless they would return to their old price. If all the retailers will act in like manner it will only be a short time until the proprietors learn that their interests are best served by a business policy which considers also the interests of those who are the distributors of their products.

Yours very truly,
J. L. BILLMAN.

Rural Retreat, Va., Oct. 14, 1898.

To the Editor.—We have decided to run the risk of losing business rather than handle goods costing the retailer over \$8 per dozen, and denounce those manufacturers who have taken advantage of the war tax to raise their prices, as hogs.

C. T. PEPPER, M. D.

In Austria-Hungary a pharmacist is forbidden by law to pass comment upon any prescription or upon the physician who gave it. Secret compacts between pharmacists and physicians are also forbidden, as detrimental to the interests of their patrons or patients.

In France a person having two diplomas, one of medicine, the other of pharmacy, cannot, according to law, practice both professions at the same time. A similar law is in force in Brazil.

The acceptance and preparation of prescriptions written in words agreed upon and designating certain articles or medicines unknown to others is forbidden in Germany.

SIXTY-TWO FOR FIFTY-TWO.

The remaining issues of the Era for this year are given free to those who send in their year's subscriptions at once. This gives the subscriber sixty-two issues for the price of fifty-two.

THE THERAPEUTICAL ECONOMICS OF OPEN COMPOSITION.*

By ALBERT B. PRESCOTT, M. D.

There is only one restriction upon the character of medicines supplied to the public, to be expected at the hands of the lawmakers in the period now before us, namely: restriction, with the intent to put a stop to concealment of composition and identity. That legal restriction to this effect may be instituted in some of the States at any time, and is likely to become prevalent, appears manifest from the temper of the law-making mind, shown in various ways, especially in the scope of the enactments against adulterations. Any alteration of composition is prohibited if it be not made known to the purchaser (or consumer), but is allowed if it be so made known. Various irregular admixtures are specifically authorized upon the one condition that they shall be explicitly announced on the label. On the other hand, various colorings and facings of food, which are harmless in themselves, are prohibited because they tend to deceive the consumer as to identity or quality of the article. The same intent appears in legal rulings for uniform standards of concentration of foods and of medicines, and it appears in the early requirements of poison-labels, lately extended, in some instances, to proprietary mixtures sold without a physician's order and without any account of contents.

Granting that some of these prohibitory measures have been worked for as means of protection to certain industries, and that in other cases the legislation has been proposed by unscrupulous persons, who seek opportunity to levy bribes, etc., it still remains true that the laws already enacted in this direction have been made possible by a prevailing conviction in the minds of common-sense people, holding as they do, the ultimate balance of power in legislation, that it is dangerous to leave covers of concealment over articles of medicine or food in the market. The average intelligent citizen, and the average plain man of the law, when the question is put fairly before him, will say without hesitation that medicines sold in packages, without the direction of a physician, ought to be compelled by law to bear a statement of their contents in terms known to science. This average man of sense will maintain that it is no affair of the State whether an article of medicine purchased in the market be pharmacopoeial or not, made by patented or concealed processes or not, trade marked by a proprietor or not, monopolized in production or not, but that it does matter to the man who is to take the article of medicine or give it to his child, whether or not he shall be informed what the article really is, in terms such as any physician or pharmacist could define and interpret; and furthermore, that the right of the man to this information might well be made an affair of the State. In fact, the layman is likely to enforce a classification of therapeutic agents, more simple than any of the systems known in pharmacology, a mere division of medicaments into the knowns and unknowns. And legislative enactment is more than liable to separate the one of these divisions from the other "as a shepherd divideth his sheep from the goats," when these matters are brought into judgment.

With this outlook, therefore, the concern of this brief paper is not one of professional ethics, but rather one of social economics. Neither the physician nor the pharmacist has any economic interest in the use of secret remedies, or any reason to delay prohibitory measures against secrecy of composition. The custom of medication by remedies named from the diseases they are alleged to cure is a custom that has no actual use for pharmacists or physicians at all.

The physician within whose function it falls to select remedies and confine their application to certain needed results, may, in his discretion, either countenance or discountenance secrecy of composition. He is liable to think little of his responsibility in this matter, because, while he is acting as an expert for his patient, the latter

has no need to be informed of the contents of medicinal mixtures. For his own judgment, the physician may believe himself able, in some cases, to arrive at the character of a medicine without a statement of its contents, and may avail himself of the convenience of a ready-made secret mixture, which henceforth holds the benefit of his approval.

The pharmacist, on the contrary, is not to judge of the selection and application of remedies of his own knowledge as an expert, neither is he to question his patron's choice among various systems of medication. So long as articles of concealed composition are not made contraband in law, it is difficult for the pharmacist to refuse to furnish them, especially difficult when they are directed by physicians. He can only do so upon the ground that such articles cannot be made subject to record, as to the identity and quantity of the distinct agents they contain, therefore, he can have no check upon them and will not supply them.

While secret medicines are tolerated by the laws, the physician or the pharmacist has but limited responsibility for their use, little influence as to their employment one way or the other. If he do not go beyond his proper province, the secrecy of remedies is not of his doing, nor can he stop the use of these articles by the people. But both the physician and the pharmacist have marked influence, as authorities in regard to medicines in use, and have influence upon law-makers as to legislation in the question of open composition by the demand of the law.

A policy of prudence, and of courage as well, with a careful study of the bearings of every legal provision proposed on the part of the staunch men of medicine and of pharmacy, can do most effective service in behalf of better economies in medication.

SOME SWISS DRUG LAWS.

To an American there are some things connected with the conduct of the drug business which seem "queer." For instance, the consul at Berne, in speaking of the licensed "apotheke" says: "While you can not buy toilet articles in these places, powdered sugar may be readily procured, and brown sugar can only be had of some few dealers in chemicals. It may not be foreign to the subject that these two latter articles can not be purchased even in a grocery store, and such a common article as cooking salt is only procurable of one licensed dealer in each street." In the same canton there is a law, almost as good as a protective tariff, requiring that all drugs used in filling prescriptions must be procured either from the stock of a "public" pharmacist or from the stock of a physician. Dispensing physicians and surgeons are obliged to purchase their compound extracts, tinctures and pharmaceutical preparations from a pharmacist in Switzerland and their chemicals from a wholesaler in Canton Berne. No person (physicians included) is allowed to advertise an alleged "cure" that is to be taken without a special prescription without the consent of the authorities. In case of violation, both the editor and printer of the paper in which the advertisement appeared are liable to punishment.

Consul Gifford at Basle notes an enterprising peculiarity of the newspapers of that city which consists in giving presents of cologne to their patrons.

PHARMACY EXAMINATIONS IN TURKEY.

The Turkish law, writes consul Madden of Smyrna, requires that all pharmacists who establish themselves shall take the examination in pharmacy at Constantinople. There are not more than ten or twelve druggists in Smyrna who have complied with the law, but by means of periodical fees (backshish) are permitted to practice. The examination of natives is very easy, indeed, many of them obtain a diploma by paying the price demanded. The examination of foreigners is given by the Imperial Institute of Medicine, by a board of physicians, mostly from French and German colleges of medicine. They are very severe. A foreigner holding an American or European diploma is subjected to a more rigid examination. So it is better not to show one's diploma.

* Presented to the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Col., June, 1898. (Jour. Am. Med. Ass'n.)

The Era Course in Pharmacy.

CONTRIBUTORS

Edias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Ph.D.
Virgil Coblenz, A.M., Ph.D.
Wilbur G. Compher, A.M., Ph.D.
M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heebner, Ph.M.B., Ph.G.
George B. Kaufman, B.Sc., Ph.D.
E. J. Kenney, Ph.C.
Henry Kraemer, Ph.G., Ph.D.
Edward Kreners, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.
CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 34 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison.
Oscar Oldberg, Ph.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M., M.D.
Henry H. Rusby, M.D.
Samuel P. Sadler, Ph.D.
L. E. Sayre, B.Sc., Ph.M.
Wilbur L. Sewille, Ph.G.
William S. Men, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wulling, Ph.G., Ph.M.D.

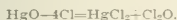
JUNIOR COURSE. LECTURE No. 11.

Inorganic Chemistry.

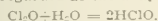
The Halogens.—Continued.

Oxygen Compounds.—Chlorin will not combine with oxygen directly, but may be made to unite with it in the presence of a base. The oxygen compounds of chlorin are exceedingly unstable, some of them exploding with terrific violence upon receiving the slightest shock, such as scratching or jarring the vessel containing the liquid acid or acid, or by the addition of easily combustible organic matter.

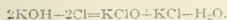
Chlorin Monoxid. Cl_2O .—When dry chlorin is passed over precipitated mercuric oxid, chlorin monoxid, Cl_2O , is formed, as follows:



This compound is an orange yellow gas, whose odor resembles chlorin and condenses under the influence of cold and pressure to a blood red liquid which explodes violently when warmed, or even by coming in contact with a scratch in the glass of the vessel in which it is confined. In the presence of water the monoxid unites with a molecule of water to form hypochlorous acid, and may therefore be regarded as the anhydrid of the latter.



The salts of hypochlorous acid, the hypochlorites, are comparatively stable, and may be formed by passing chlorin into a cold dilute solution of an alkaline hydroxid, when a mixture of hypochlorite and chlorid of the metal is formed.



If the alkali be hot or concentrated, a chlorate will be formed instead of a hypochlorite.

Hypochlorous acid and the hypochlorites are valuable as bleaching agents, owing to the readiness with which they yield free chlorin upon the addition of a weak acid. The common bleaching powder of the shops, known as "chloride of lime," but more properly as "chlorinated lime," is made by passing chlorin gas into moist calcium hydroxid.

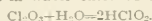
The exact nature of the compound to which chlorinated lime owes its bleaching powers it not understood. The two most probable views are that it consists of calcium hypochlorite, $\text{Ca}(\text{ClO})_2$, or of a compound having the composition represented by CaOCl_2 .

The slow evolution of chlorin from bleaching powder on exposure to the air is probably due to the action of the carbon dioxid of the atmosphere upon the chlorin-yielding constituent.

Chlorin Trioxid, or Chlorous Anhydrid. Cl_2O_3 .—This body may be prepared by the reduction of chloric acid, HClO_3 . It is a greenish yellow gas, with an odor resembling, but more irritating and corrosive than, pure chlorin. It can be condensed by cold and pressure to a reddish brown liquid, unstable and explosive, but less

so than the monoxid. The existence of chlorin trioxid as a definite compound has been disputed, some chemists asserting that the substance so called is a mixture of the monoxid with chlorin, oxygen and carbon dioxid.

When dissolved in water chlorous acid is formed.



The salts of chlorous acid, the chlorites, like the hypochlorites, are unstable and are liable to explode when rubbed with easily oxidizable substances.

Chlorin Dioxid or Peroxid. ClO_2 .—A heavy, dark yellow, highly explosive gas, prepared by the action of concentrated sulfuric acid upon potassium chlorate. In the reaction chloric acid, HClO_3 , is probably first liberated, and then splits up into perchloric acid, HClO_4 , chlorin peroxid and water, and possibly other products. By the action of a freezing mixture, as snow and salt, the gas can be condensed to a red brown liquid. Both gas and liquid are frightfully explosive, frequently decomposing without any assignable cause.

No acid is known corresponding to this oxid.

Chloric Acid, HClO_3 , and Perchloric Acid, HClO_4 .—When chlorin is passed into a hot or concentrated solution of an alkaline hydrate, a mixture of chlorate and chlorid is produced.



The chlorate is separated out by crystallization and chloric acid may be prepared from this by the action of dilute sulfuric acid.

When potassium chlorate is heated to a certain point it fuses, gives off oxygen and is converted into a mixture of potassium perchlorate and chlorid.



The perchlorate may be separated from the chlorid by its lesser solubility, and perchloric acid prepared from it by the action of sulfuric acid, thus:



Because of the readiness with which they decompose and yield up their oxygen, chloric and perchloric acids are oxidizing agents of great force, instantly setting fire to such substances as shavings, cork, paper, etc., the reaction occurring with explosive violence if the quantities be large. For a similar reason their salts, the chlorates and perchlorates, are dangerous when triturated with combustible bodies. A number of serious accidents have resulted from the careless grinding of potassium chlorate in a mortar with oxidizable substances. When such substances are to be combined, they should be lightly mixed on a sheet of paper, without friction, and the mixtures should not be stored for any length of time.

Chlorin Pentoxid. Cl_2O_5 , corresponding to chloric

acid, and the heptoxid, Cl_2O_7 , corresponding to perchloric acid in which chlorine would have a valence of seven, have never yet been prepared in the free state.

BROMIN.

Symbol Br. Valence 1, 3, 5. Atomic Weight 79.34. Specific Gravity 2.90.

Historical.—Bromin was discovered in the bitter of salt works by Balard, of Montpellier, France, in the year 1826. It had previously been obtained by Liebig, who regarded it as a compound of chlorine and iodine, and also by Joss, who believed it to be selenium. The name is derived from the Greek *bromos*, a stench, in allusion to its powerful and disagreeable odor.

Natural Sources.—Bromin occurs combined with metals as bromids, principally of sodium, potassium and magnesium, in sea waters and in salt beds. The principal commercial source is the *bittern* or residual brine of salt works, from which it is largely produced in the States of Ohio, Pennsylvania and West Virginia.

Preparation.—The element is prepared from brine by concentrating to remove the less soluble salts which crystallize out, and treating the residual liquor, now strong in bromids, with oxidizing agents, as chlorine, nitric acid, or a mixture of manganese dioxide and sulfuric acid, and distilling.

Physical Characters.—Bromin at ordinary temperatures is a heavy, volatile, dark brown or red mobile liquid, evolving orange red vapors when exposed to the air, and possessing a strong, penetrating and unpleasant odor. The vapors are suffocating and poisonous.

Bromin is the only element, except mercury, which is a liquid at ordinary temperatures. It is nearly three times as heavy as water, (S. G. 2.90 at 15°C .), freezes at -7.2°C . and boils at about 60°C . It is soluble in about 30 parts water, forming a brownish-yellow solution, from which at 4°C . a crystalline hydrate, having the composition $\text{Br}_2 \cdot 10\text{H}_2\text{O}$, separates out. Like the corresponding chlorine hydrate, this compound gradually decomposes into the free element and water. Bromin is freely soluble in alcohol, ether, chloroform and carbon disulfid, forming orange red solutions.

Chemical Properties.—Bromin is a very active element, though less so than chlorine, and combines readily with many other elements to form bromids. A singular exception is found in the case of metallic sodium, with which it may be boiled with only a slight reaction, while with metallic potassium it combines violently.

Its bleaching and oxidizing effects upon organic coloring matter are similar to but less marked than those of chlorine. Its aqueous solution, known as bromin water, gradually becomes colorless, the bromine combining with the hydrogen to form hydrobromic acid, and releasing oxygen.

Compounds of Bromine.

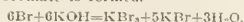
Bromine combines with hydrogen to form Hydrobromic Acid, HBr . Like chlorine, it does not combine directly with oxygen, but does so indirectly, forming two acids, hypobromous, HBrO , and bromic, HBrO_3 . No free oxids of the element have yet been prepared.

Hydrobromic Acid. HBr .—Hydrobromic acid is a colorless gas resembling hydrochloric acid in smell and chemical properties. An aqueous solution of the acid may be prepared by the action of a reducing agent such as phosphorus or hydrogen sulfid, on bromine, in the presence of water. A ten per cent. solution of the gas constitutes the official Diluted Hydrobromic Acid.

Like the chlorids, nearly all the bromids are soluble in water, except silver, mercurous and lead bromids, the last being sparingly soluble.

Hypobromous Acid. HBrO .—Hypobromous acid and the hypobromites are prepared exactly as hypochlorous acid and the hypochlorites, and have similar properties. The hypobromites are known only in solution, and even then rapidly decompose.

Bromic Acid. HBrO_3 .—When bromine is added to a concentrated solution of an alkaline hydrate a mixture of bromid and bromate is formed.



The bromate, being the less soluble salt, is easily separated by crystallization. The free acid may be ob-

tained by first making silver bromate from the alkaline bromate and then decomposing the silver salt with hydrochloric acid. Bromic Acid and its salts closely resemble the corresponding compounds of chlorine.

The existence of Perbromic Acid, HBrO_4 , is disputed. **Characteristic Reactions.**—The bromids are recognized by the characteristic properties of bromine when released by oxidizing agents, such as chlorine, nitric acid, or by manganese dioxide in the presence of sulfuric acid. Free bromine colors chloroform, ether or carbon disulfid brownish-red when shaken with them. It colors starch solution yellow.

From the salts of its oxygen acids the bromine is released by means of reducing agents, as hydrochloric and sulfurous acids.

IODINE.

Symbol, I. Valence, 1, 3, 5. Atomic Weight, 125.80. Specific Gravity 4.55.

Historical.—Iodine was discovered in 1811 by Courtois, a Parisian soap boiler, who found it in kelp liquor after the extraction of sodium carbonate. Its properties were determined mainly through the studies of Sir Humphrey Davy and Gay Lussac, the latter of whom proposed the name iodine from the Greek *iodos*, violet colored, because of the splendid violet color of its vapor.

Natural Sources.—Iodine is associated in nature with chlorine and bromine, as iodids of the alkalis, in sea water, salt springs, and in sea plants and animals, and, like these related elements, is released from combination by the action of oxidizing agents.

Preparation.—The iodine of commerce is obtained largely from kelp, the name given to the ash made from sea weeds thrown up by storms on the north Atlantic coasts. The ash is lixiviated, and the resulting lye partially freed from accompanying carbonates, chlorids and sulfates by concentration and fractional crystallization. The residual brine is treated with sulfuric acid and manganese dioxide, and the released iodine distilled off.



The most important present source is in the nitre beds of Chili and Peru. It exists in these as sodium iodate, from which it is obtained by the aid of reducing agents, as sulfurous acid, or its acid salts.

Physical Characters.—At common temperatures iodine is a bright, shining, crystalline solid, of a steel gray color and metallic luster, having a pungent odor, resembling the odors of chlorine and bromine, but fainter.

The specific gravity of solid iodine is 4.948 at 17°C . Heated in the air it yields splendid violet colored vapors, which in the absence of air are deep blue. It is soluble in about 5,000 parts of water and freely soluble in alcohol, ether, carbon disulfid, and similar solvents. It also dissolves freely in a solution of potassium iodid. With carbon disulfid or chloroform it forms a red to violet solution according to concentration. With starch paste it yields a fine deep blue, which disappears on warming and reappears on cooling.

Chemical Properties.—In chemical properties, iodine is the least active of the halogens. Like the other members of the group it bleaches organic matter, and corrodes metals, but not so readily as the three preceding elements, since it is not able to decompose water, either in presence or absence of light. Like bromine, it reacts with explosive violence with potassium, but has but little effect on sodium, even when heated with it.

PRACTICAL STUDIES.

1. Place several small crystals of potassium chlorate in a test tube, add enough water to cover the crystals, and one or two Cc hydrochloric acid, warm. What occurs? Test the evolved gas with calico, as in the preceding lecture.
2. Put one or two small crystals of potassium chlorate in a dry test tube. Take the tube in a holder, turn the mouth of the tube away from every one present and add a few drops of undiluted sulfuric acid. Still holding the tube in the manner described, warm it gently. What occurs? What compounds are probably formed?
3. Powder a few grains of potassium chlorate, mix it with an equal bulk of powdered sulfur, wrap the mix-

ture in a small piece of tissue paper, lay the package on a piece of iron and strike it a sharp blow with a hammer. What would probably result from an attempt to powder potassium chlorate and sulfur together in a mortar?

4. Prepare free bromin by treating a small crystal of potassium bromid with concentrated sulfuric acid and heating. Hydrobromic acid is first set free and then decomposed, yielding brown-red vapors of bromin. Test the vapors with colored calico, as was done with chlorin. Avoid inhaling the fumes.

5. Prepare a solution of hydrobromic acid by placing in a small flask or test tube about a gram of red phosphorus, covering with water, and then adding gradually an equal volume of bromin water. Agitate, and if necessary, warm until the mixture becomes colorless. Pour off the clear solution and test as in the next experiment.

6. Add a solution of hydrobromic acid, or a solution of a bromid (e. g., potassium bromid) to solutions of silver nitrate, lead acetate and mercurous nitrate. What occurs? How do the results compare with the corresponding experiment under hydrochloric acid? Represent the reactions by equations.

7. To a solution of a bromid add a few drops of nitric acid, heat until it becomes colored, cool, and add some carbon disulfid or chloroform. Agitate thoroughly, and note the color of the heavier liquid. Repeat the experiment, using starch paste instead of carbon disulfid or chloroform.

8. In a clean, dry flask, or in a large test tube, place a few small crystals of iodine and heat until the evolved vapors fill the vessel. What is the color of the vapors? As the vapor disappears, what is found on the cooler portions of the glass?

9. Make some starch paste in the following manner: Mix thoroughly, 0.5 Gm. starch with cold water, and add the mixture to 25 Cc. of boiling water in an evaporating dish, and continue the boiling, with stirring, until the solution becomes clear. Add a few drops of this starch paste to a test tube about one third full of cold water slightly colored with a small crystal of iodine and mix. Observe the result, first when the mixture is cold and then after heating.

10. To an aqueous solution of iodine add two or three Cc. of carbon disulfid or chloroform, and shake thoroughly. What change is effected?

JUNIOR COURSE. LECTURE NO. 12.

Pharmaceutical Physics.

Mass and Volume Relations. The Mechanical Powers.

In the preceding studies the masses of objects have been considered without regard to the amount of space occupied, and volumes without regard to their masses. When these two qualities are considered in connection, certain new and interesting relations appear, some of which are of great importance in practical pharmacy.

Flotation.—When a solid body is placed on a liquid, one of three things may occur; it may sink to the bottom, float indifferently at any point in the liquid, or rest on the surface with only its lower portion immersed. Which position it takes depends upon the relation of its weight to that of an equal bulk of the liquid. If it is heavier than an equal bulk of the liquid, it sinks. If it is just as heavy, the effect is the same as the addition of so much of that liquid, and it will consequently float wherever placed. If the solid is lighter than an equal bulk of the liquid, it will sink until the weight of the liquid displaced is equal to the weight of the solid, at which point it will float.

Loss of Weight, Principle of Archimedes.—If a piece of metal be first weighed in air, then attached by a thread to the balance beam, immersed in water and again weighed, it will be found to have lost in weight, i. e., that it is buoyed up by the water. (Fig. 32).



Fig. 32.—Weighing Solid in Water.

What is the amount of loss in weight? It is evident that the metal displaces its own bulk in the liquid. If the experiment be made in a graduated jar, and the amount of rise in the liquid noted when the metal is immersed, then that quantity of liquid poured out and weighed, its weight will be found to be the weight which the metal has apparently lost. No matter how often the experiment be tried, the result will always be the same. It is evident, therefore, that when a solid is immersed in a liquid its loss in weight is equal to the weight of an equal bulk of the liquid.

This is known as the principle of Archimedes, and must be thoroughly comprehended by the student before the subject of specific gravity can be properly understood.

Density and Specific Gravity.—If equal cubes of iron, lead, coal, wood, etc., be compared it will be found that, although equal in volume, they possess quite different weights. This is owing to the fact that they contain different quantities of matter in the same space, or that they differ in *Density*. Hence density is defined as the quantity of matter in a unit of volume.

In the C. G. S. system the density of a given substance is the number of grams in a cubic centimeter. This relation of mass to volume is better known as specific density. The abstract number which expresses this ratio of weight to volume is known as *Specific Weight*, or more commonly as *Specific Gravity*. It indicates the number of times the substance considered is heavier than the standard substance. *Specific Weight*, or *specific gravity*, is commonly defined as the ratio of the weight of a body to the weight of an equal volume of a standard.

For liquids and solids the standard substance is Water. Either Air or Hydrogen is used as the standard for gases.

The distinction between specific density and specific gravity is this: *Specific Density* is a concrete number, representing a definite number of units of mass in a unit of volume, as grams in a cubic centimeter; *Specific Gravity* is an abstract number, expressing a ratio, without regard to any particular volume or mass. The numerical expression is the same for both. When considered in a concrete sense it expresses density; when considered as an abstract ratio, it expresses specific weight.

Specific Volume.—The ratio of the volume of any substance to the volume of an equal weight of a standard substance is known as *Specific Volume*. It is just the reverse of specific weight. In determining the latter we take equal volumes of the substance and the standard and compare their weights; in specific volume we take equal weights and compare their volumes. Like differences in specific weights, differences in specific volumes indicate differences in qualities. Water is also taken as the standard for specific volume.

The higher the specific volume of a substance, the lower will be its specific weight, and as a consequence the product of the two will always be a constant quantity, i. e., unity. It follows, therefore, that unity divided by specific weight will give specific volumes, or vice versa.

$$S. W. \times S. V. = 1, \text{ or } \frac{1}{S. W.} = S. V., \text{ or } \frac{1}{S. V.} = S. W.$$

Determination of Specific Gravity and Volume.—In the determination of specific gravity the first step is to find the volume of the object. If the substance is a liquid, it has only to be measured in a graduated vessel, but if solid, its volume can be conveniently measured only when it possesses a regular form, as a cube. In the majority of instances this is impossible owing to the irregularity of the object. In such cases use is made of the principle of Archimedes. The object is weighed first in air, and then in water, and the last weight subtracted from the first. The loss in weight is the weight of an equal volume of water, and as a gram of water

measures one cubic centimeter, it is evident that the solid measures as many cubic centimeters as it displaces grams of water. The only remaining step is to find the ratio between the weight of the object and the weight of an equal volume of water, and as a ratio is simply an indicated division, use is made of the old rule: *Divide the weight in air by the loss of weight in water.*

A full discussion of the practical determination of specific gravities and specific volumes belongs more properly to Pharmaceutical Processes, under which the subject will receive further consideration.

Standard Temperatures.—Since the volumes of bodies, and consequently their densities, vary with the temperature, it is necessary that some particular temperature be adopted as the standard.

For purely scientific investigations this is usually taken as 4° C, which is the temperature of water at its greatest density. The standard temperature adopted by the U. S. Pharmacopoeia is 15° C. for both the standard and the substance whose specific gravity is to be taken. Some of its tables, however, are based upon a temperature of 15° C. for the substance and of 4° C. for the standard.

THE MECHANICAL POWERS.

Machines.—A machine is any contrivance employed for the transfer or formation of energy in the production of work.

All mechanical structures, no matter how intricate or complex their construction, can be reduced by analysis to a combination of two or more "simple machines." Of these the six more important are the *Lever, Wheel and Axle, Inclined Plane, Wedge, Screw and Pulley.*

Efficiency of Machines.—The efficiency of a machine is the ratio of the work produced to the energy supplied, and is determined by finding the value of this ratio, or by dividing the work done by the energy applied.

If machines were ideally perfect, i. e., if they could work without friction or loss of energy, their efficiencies would be 100 per cent. Such a machine is, of course, an impossibility.

For the better comprehension of the laws applicable to them the use of frictionless machines is assumed in the following paragraphs:

Mechanical Advantage.—By Mechanical Advantage is meant the benefit derived from the use of a machine.

Owing to the uncreatability of energy, a perfect machine could yield only as much energy as was applied to it, while because of friction and imperfections, actual machines cannot be made to yield as much. Mechanical advantage, therefore, must be something else than a gain of energy. This something else may be the utilization of energy not otherwise available, the more advantageous application of energy, or the ability to use a small force so as to overcome a large resistance.

The Law of Machines.—Assuming a machine to be frictionless and to work without loss of energy, the general law of its action would be: *The force applied, multiplied by the distance through which it is applied, will be equal to the resistance overcome, multiplied by the distance through which it is overcome.*

If f represent the force applied, s the space through which it acts, r the resistance and s' the space through which the resistance is overcome, the law may be regarded by the following formula: $fs = rs'$.

The law and formula differently stated to suit different circumstances are applicable to all machines, whatever their form. They apply, however, only to the ideal machine where no energy is wasted. In all actual machines, allowance must be made for waste. Representing this waste by w , the formula becomes: $fs - ps' = w$.

The Lever.—The Lever in its simplest form is a straight bar, supported on a pivot about which it is free to move.

The three important points on a lever are the Fulcrum, or point of support, designated by F ; the point at which the force or pressure is applied, designated by P , and the point at which the resistance, or "weight," is overcome, designated by W . The terms load and weight are commonly used to represent resistance. According to the relative positions of these three points, levers are divided into three kinds or "orders." (Fig. 33). In the first order, the fulcrum is between the load and the

pressure. In the second order, the load is between the fulcrum and the pressure. In the third order, the power is between the fulcrum and the load.

As an aid to the recollection, the student may remember that the letters F , L , P representing the middle points of the three kinds of levers, stand in alphabetic order.

The distance from the fulcrum of any lever to the point of application of the force is known as the force, or pressure arm. The distance from the fulcrum to the point of application of the load or weight is known as the load or weight arm.

The ratio of the length of the pressure-arm to the length of the weight-arm is known as the *Leverage*. The greater the leverage, the larger the load which can be moved with a given force.

The special law of the lever may be stated as follows: *The pressure multiplied by its distance from the fulcrum equals the load multiplied by its distance from the fulcrum.*

That this is but a restatement of the general law of machines in another form is evident from the fact that the distances through which the ends of the lever must move are proportional to their respective distances from the fulcrum.

Mechanical Advantage of the Lever.—By increasing the length of the force-arm relatively to the load-arms, i. e., by increasing the leverage, a very small force may be made to move a very heavy weight. As compensation for this, the force must travel through a greater distance and move with greater velocity than the weight is moved. What is gained in the load is gained at the expense of velocity and distance.

If the short arm be made the force-arm, then the above advantage is reversed. The load will be moved through a greater distance and at a greater velocity, but the force applied will have to be increased correspondingly. In this case, the gain in velocity and distance is compensated for by loss in force.

The Compound Lever.—If the load-arm of one lever be made to bear on the force-arm of another, the result is a Compound Lever. (Fig. 34). This compounding may be carried to almost any extent with a corresponding increase in the load which may be lifted with a given force.

The law of the compound lever may be stated as follows: *The continued product of the lengths of the pressure-arms into the pressure will equal the continued product of the lengths of the load arms into the load.*

In the discussion of the lever it has been supposed to be an ideal machine, without weight or friction. In actual levers these factors must be taken into account.

Pharmaceutical Applications.

The Balance.—The special application of the lever to pharmacy is in the construction of the Balance, which is commonly a lever of the first order.

In this instrument the fulcrum is the central point of support, the "weights" may be regarded as the force, and the article to be weighed as the load. In the equal arm balance (Fig. 35), the fulcrum is exactly midway between the other two points; in the unequal arm balance (Fig. 36), the fulcrum is placed nearer the load. The longer arm of the latter balance is usually provided with a movable weight known as a *Poise*.

In the equal arm balance the ratio of the power-arm to the load-arm, L , c , the leverage, is unity. Hence a given weight placed in one pan will exactly balance an equal weight in the other.

In the unequal arm machine, the load which a given weight will sustain depends upon the relative lengths of the arms. A given poise on the longer arm will sustain

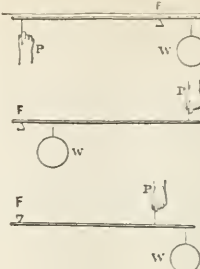


Fig. 33.—The Three Orders of Levers.



Fig. 34.—Compound Lever.

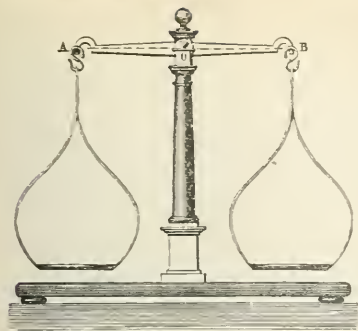


Fig. 35.—Equal Arm Balance.

as many times its own weight on the other arm as the distance of the poise from the fulcrum is greater than the distance of the load from the fulcrum. Or, applying the law of the lever, the product of the poise into the distance from the fulcrum will equal the product of the load into its distance from the fulcrum. If the distance of the poise be five times greater than the distance of the load, then the former will balance a load five times as great.

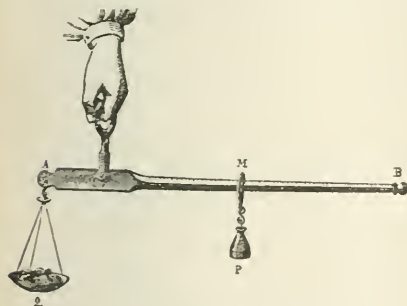


Fig. 36.—Unequal Arm Balance.

The Compound Lever Balance.—For the weighing of heavy goods, the simple lever balance would have to be inconveniently long, or the standard weights inconveniently large. These difficulties are avoided by the appli-

cation of the compound lever to the construction of weighing machines. The most common example is the familiar "Platform Scales" of the warehouse. In this balance, the article to be weighed is placed upon a platform supported by four equal levers of the second order, which in turn rest upon a single lever of the second order, and this one by means of a vertical rod, acts as the load for a lever of the first order. The last is the only one of the series which is in sight, and is counterbalanced by a movable poise on the longer arm. (Fig. 37).

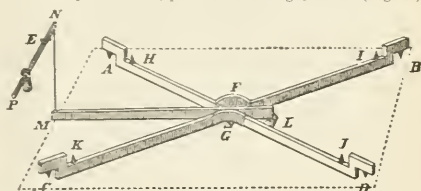


Fig. 37.—Levers of Platform Scales.

Small machines of this pattern are sometimes used on the counter or in the warehouse; large ones are used for the weighing of wagons, railroad cars, etc.

PRACTICAL STUDIES.

(1) Using an apparatus like Fig. 32, weigh some solid, as a lump of coal, first in air and then in water. How much weight is lost? Place some water in a narrow graduated vessel; note where the water stands, place in it the solid, and observe how much the water rises. Pour out the increased volume of water. Weigh it and compare with the loss in weight previously set down. Calculate the specific gravity.

Unless carefully performed with the aid of an accurate balance, some discrepancy will appear in the two weights.

A rough balance for use in such experiments can be made by suspending a pine ruler on a pin thrust through the middle. The pans can be squares of cardboard, suspended by strings from the ends of the beam.

(2) Measure the distance from the fulcrum of an unequal arm balance to the supports which hold the pans. Remove the poise and ascertain its exact weight. Replace the poise, place any article in the scale pan, and move the poise until it balances. Multiply the weight shown by the distance of the pan supports from the fulcrum, also the weight of the poise by its distance from the fulcrum. Are the two products equal? Why?

(3) Turn a platform balance on its side, and examine the mechanism as it appears on the bottom. Trace the connection and office of the various levers.

SENIOR COURSE. LECTURE No. 11.

Official Preparations.

SYRUPS.—Continued. Honeys and Mucilages.

SUB-CLASS III.

SYRUPS CONTAINING BOTH ORGANIC AND INORGANIC INGREDIENTS.

In four official syrups part of the important ingredients are organic and part inorganic. Syrup of Calcium Lactophosphate might also be properly included here, but has been previously discussed. Two of the syrups of this sub-class contain alkaline substances added for the purpose of holding resinous and pectinous substances in solution.

Syrupus Ferri, Quinine et Strychnine Phosphatum. Syrup of the Phosphates of Iron, Quinine and Strychnine.—Dissolve 20 Gm. Soluble Ferric Phosphate in 50 Cc. water, in a porcelain capsule, with heat. Add 48 Cc. Phosphoric Acid, 30 Gm. Quinine Sulfate and 0.2 Gm. Strychnine, and stir until dissolved. Filter the liquid into 100 Cc. Glycerin, add sufficient Syrup to make 1000 Cc. and mix. Strain if necessary.

This preparation is also known as *Easton's Syrup*, Syrup

of Three Phosphates, etc. Each Cc. contains 0.02 Gm. soluble ferric phosphate, 0.03 Gm. quinine sulfate, and 0.0002 Gm. strychnine. The average dose is about 4 Cc., or a teaspoonful.

In spite of the glycerin added as a preservative, the syrup gradually deposits a precipitate of basic ferric phosphate on standing.

Syrupus Scille Compositus. Compound Syrup of Squill.—Mix 80 Cc. each Fluid Extract of Squill and Fluid Extract of S-nega and evaporate on a Water Bath to 100 Gm. Mix with 350 Cc. Water, triturate with 10 Gm. Precipitated Calcium Phosphate and filter, adding water through the filter to make 400 Cc. Add 2 Gm. Antimony and Potassium Tartrate dissolved in 25 Cc. Hot Water, dissolve in the mixture liquids 750 Gm. Sugar without heat and strain, passing water through the strainer to make 1000 Cc.

This is the modern form of the older *Corr's Hicc Syrup* which contained honey instead of sugar. It is expectorant and emetic, and is used in mild cases of croup to

produce vomiting. Dose for children 1.5 to 3.5 Cc., or ten to sixty minims. It should be used cautiously, as the tartar emetic which it contains is an active depressant.

Syrupus Rhei. Syrup of Rhubarb.—Mix 100 Cc. Fluid Extract of Rhubarb with 4 Cc. Spirit of Cinnamon and a solution of 10 Gm. Potassium Carbonate in 50 Cc. Water. Add 50 Cc. Glycerin and sufficient Syrup to make 1000 Cc. and mix thoroughly.

The alkaline carbonate unites with the resinous matter of the fluid extract and forms a soluble compound which is not precipitated by the water added.

Syrupus Senegae. Syrup of Senega.—Mix 200 Cc. Fluid Extract of Senega with 300 Cc. Water and 5 Cc. Ammonia Water, and let stand for several hours. Filter and pass water through the filter to make 550 Cc. Dissolve 700 Gm. Sugar in the filtrate without heat, strain and pass sufficient water through the strainer to make 1000 Cc.

The object of the Ammonia Water is to hold in solution pectin-like substances which would otherwise be precipitated.

TABULAR VIEW OF OFFICIAL SYRUPS.

SUB-CLASS I.—ORGANIC SYRUPS.

" II.—INORGANIC SYRUPS.

" III.—ORGANIC AND INORGANIC SYRUPS.

SUB-CLASS I.—SYRUP OF ORGANIC SUBSTANCES.

1. SUGAR DISSOLVED IN MEDICATING LIQUID WITH HEAT.

Syrupus.—Syrup.

Syrupus Rubi Idæi.—Syrup of Raspberry.

Syrupus Picis Liquidæ.—Syrup of Tar.

Syrupus Sarsaparillæ Compositus.—Compound Syrup of Sarasaparilla.

2. SUGAR DISSOLVED IN MEDICATING LIQUID WITHOUT HEAT.

A.—Made from *Extemporized Infusions.*

Syrupus Althææ.—Syrup of Althæa.

Syrupus Pruni Virginianæ.—Syrup of Wild Cherry.

Syrupus Sennæ.—Syrup of Senna.

B.—Made from *Extemporized Medicated Waters.*

Syrupus Aurantii.—Syrup of Orange.

Syrupus Tolucentis.—Syrup of Tolu.

Syrupus Lactucarii.—Syrup of Lactucarium.

Syrupus Zingiberis.—Syrup of Ginger.

C.—Made from an *Official Aromatic Water.*

Syrupus Aurantii Florum.—Syrup of Orange Flowers.

D.—Made from an *Extemporized Seed Emulsion.*

Syrupus Amygdali.—Syrup of Almond.

3. MADE BY ADMIXTURE OF SYRUP AND MEDICATING LIQUID.

A.—The *Medicating Liquid Is an Aqueous Solution.*

Syrupus Acetiæ.—Syrup of Acacia.

Syrupus Acidæ Citricæ.—Syrup of Citric Acid.

B.—The *Medicating Liquid Is an Aromatic Tincture.*

Syrupus Rhei Aromaticus.—Aromatic Syrup of Rhubarb.

C.—The *Medicating Liquid Is a Fluid Extract.*

Syrupus Krameriæ.—Syrup of Krameria.

Syrupus Rosæ.—Syrup of Rose.

Syrupus Rubi.—Syrup of Rubus.

4. MADE FROM MEDICINAL VINEGARS, OR CONTAINING ACETIC ACID.

A.—From an *Extemporized Medicinal Vinegar.*

Syrupus Allii.—Syrup of Garlic.

B.—From an *Official Vinegar.*

Syrupus Scillæ.—Syrup of Scyll.

C.—From *Fluid Extract, with Addition of Acetic Acid.*

Syrupus Ipecacuanhæ.—Syrup of Ipecac.

SUB-CLASS II.—SYRUPS OF INORGANIC SUBSTANCES.

1. SUGAR DISSOLVED WITH AID OF HEAT.

Syrupus Calcis.—Syrup of Lime.

2. SUGAR DISSOLVED WITHOUT HEAT.

Syrupus Calcis Lactophosphatis.—Syrup of Calcium Lactophosphate.

Syrupus Hypophosphitum.—Syrup of Hypophosphites.

3. MADE BY ADMIXTURE OF MEDICATING LIQUID AND SYRUP.

Syrupus Acidæ Hydriodici.—Syrup of Hydriodic Acid.

Syrupus Ferri Iodidi.—Syrup of Ferrous Iodide.

4. SOLID DISSOLVED IN A MEDICATED SYRUP.

Syrupus Hypophosphitum cum Ferro.—Syrup of Hypophosphites with Iron.

SUB-CLASS III.—SYRUPS OF BOTH ORGANIC AND INORGANIC SUBSTANCES.

Syrupus Ferri, Quininae et Strychninae Phosphatum.—Syrup of Iron, Quinine and Strychnine Phosphates.

Syrupus Scillæ Compositus.—Compound Syrup of Scyll.

Syrupus Rhei.—Syrup of Rhubarb.

Syrupus Senegæ.—Syrup of Senega.

MELLITA. THE HONEYS.

Honeys are solutions of medicinal substances in strained or clarified honey. Honey is a natural syrup, and the medicinal honeys therefore correspond to the medicinal syrups.

This once important class of galenicals has, with the introduction of more efficient preparations, dwindled in number until the present Pharmacopœia contains but three, Commercial Honey, Clarified Honey and Honey of Rose. The present official honeys are used only as vehicles to disguise the taste of disagreeable medicines.

An old class of preparations known as *ozymels*, from *ozus*, vinegar, and *mel*, honey, were made by the addition of vinegar or acetic acid to honeys, (see under Syrupi).

Mel.—Honey. Commercial Honey freed from the comb. For description and properties, see under Pharmaceutical Materials.

Mel Despumatum. Clarified Honey.—Mix Honey with 2 per cent, by weight of thoroughly shredded and recently washed Paper Pulp and heat on a Water Bath as long as a scum rises. Add sufficient Distilled Water to make up the loss by evaporation, strain, and add 5 per cent, by weight of Glycerin.

The scum which is removed consists of wax, albuminous matters and other impurities which would interfere with the transparency and permanence of the honey. The object of the glycerin is to prevent the granulation which so often occurs in honey.

Clarified honey is used as the base of the medicinal honeys, as an excipient and as an addition to confections, etc.

Mel Rosæ. Honey of Rose.—Mix 120 Cc. Fluid Extract of Rose with sufficient Clarified Honey to make 1,000 grams. Used as a pleasant addition to gargles, etc., and as the excipient in Mass of Mercury.

MUCILAGINES. THE MUCILAGES.

A mucilage is a viscid, syrupy liquid or a semi-liquid paste, of gum and water, the consistence depending upon the nature of the gum. If the gum is of the soluble Arabian type, the mucilage is a syrupy solution; if it is of the insoluble Bassorin variety, the mucilage is a semi-solid, or a thin paste of gum and absorbed water.

The mucilages exhibit the bland and demulcent properties of the gums, and are used principally as soothing drinks in fevers, or as bland and inactive bases for cough mixtures.

They are generally unstable preparations, unless some preservative has been added, and should be made only in small quantities and for immediate consumption.

Four mucilages are official. Two are prepared directly from gums, and two by dissolving out the gums which are contained in the cellular structure of plants.

Mucilages Made Directly from Gums.

Mucilage Acaciæ. Mucilage of Acacia.—Made by washing 340 Gm. of Acacia, in small pieces, in cold water, to free from adhering dirt, draining, adding to enough water to make a thousand grams of mixture, and agitating or stirring occasionally until dissolved. Solution will

be facilitated by resting the bottle on its side in the intervals between shaking.

The solution can also be satisfactorily accomplished by circulatory displacement.

The product should be strained, and kept in a cool place in completely filled and well stoppered bottles.

The injunction to take the *acacia* in *small fragments* is of special importance. The powdered form is usually made from an inferior quality of gum and will not only make a darker mucilage, but tends to form tenacious, dough-like masses, which are exceedingly hard to dissolve.

Mucilage of *Acacia* is incompatible with and precipitated by solutions of subacetate of lead, strong solutions of ferric chlorid, borax, concentrated alcoholic preparations, solutions of oxalates, carbonates, phosphates, some mineral acids, etc. This precipitation may sometimes be prevented by liberal dilution of the liquids before mixing.

Mucilage of *acacia* is used as an emulsifier, as a demulcent addition to cough mixtures, and as an excipient for pills, troches and masses. Its use as an excipient, especially for pills, is restricted by the fact that it tends to produce a stone-like hardness, which retards or prevents solution in the alimentary canal.

Mucilago Tragacanthæ. Mucilage of *Tragacanthæ*.—

Prepared by adding 6 Gm. of *Tragacanth* to a boiling mixture of 18 Gm. *Glycerin* and 75 Cc. *Water*, and macerating for twenty-four hours, with occasional stirring. Sufficient *water* is then added to make 100 Gm., the mixture beaten in a mortar until of uniform consistence, and forcibly strained through muslin.

The *Bassorin* which constitutes the principal part of *Tragacanth* absorbs *water*, and swells up greatly, but does not dissolve. For this reason the mucilage of *tragacanth* is a semi-liquid, of a paste-like consistence.

The principal use of this mucilage is as an excipient in official troches and pills, and as an emulsifying agent.

Made by Extracting Mucilaginous Principles from Vegetable Substances.

These are thin liquids, made by macerating or digesting a vegetable tissue in *water* until the contained gum is extracted. They are used principally as demulcent drinks, and should be freshly prepared when wanted.

Mucilago Sassafras Medulle. Mucilage of *Sassafras* Pith.—Two Gm. *Sassafras* Pith are macerated in 100 Cc. *Water* for three hours, with occasional stirring, and the mixture strained.

Mucilago Ulmi. Mucilage of *Elm*.—Digest 6 Gm. *Bruised Elm Bark* in 100 Cc. *Water* on a *Water Bath*, in a covered vessel, for one hour, and strain.

SENIOR COURSE, LECTURE No. 12.

Pharmaceutical Latin.

BY PROF. WILBER G. COMPTON, A.M., PH.D.

Third Declension.

The third declension contains a very large list of nouns, classed under a number of divisions. The nominative varies very greatly in form. However, if the nominative and genitive are given, the declension will not involve many difficulties.

The stem of the word, that part to which the case endings are added, is found by dropping the *s* of the genitive singular. This stem is rarely like the nominative. The third declension contains nouns of all three genders, and the following general rules of gender should be carefully observed: *Masculine* nouns end in *o*, *or*, *os*, *er* and *es*, increasing in the genitive, that is, having one more syllable in the genitive than in the nominative; *feminine* nouns end in *is*, *is*, *ys*, *x* and *es*, not increasing in the genitive, and *s* preceded by a consonant; *neuter* nouns end in *a*, *e*, *i*, *y*, *c*, *l*, *n*, *t*, *ar*, *ur*, *us*.

To these rules there are many exceptions which must be learned from the grammar or lexicon.

Case Endings.

The following tables will show the case endings of the third declension, the endings for masculine and feminine nouns being the same.

Mas. and Fem.		Neuter.	
Sing.	Plu.	Sing.	Plu.
N. <i>s</i> , etc.	es.	N. <i>a</i> (ia).	um (ium).
G. <i>i</i> , etc.	um (ium).	G. <i>i</i> <i>s</i> .	um (ium).
D. <i>i</i> .	ibus.	D. <i>i</i> .	ibus.
A. <i>e</i> (im).	es.	A. <i>e</i> .	a (ia).
V. <i>s</i> , etc.	es.	V. <i>a</i> (ia).	ibus.
Ab. <i>e</i> (i).	ibus.	Ab. <i>e</i> (i).	ibus.
Flos.		Miles.	
Sing.	Plu.	Sing.	Plu.
N. <i>flos</i> .	flor-es.	N. <i>miles</i> .	millit-es.
G. <i>flor-is</i> .	flor-um.	G. <i>millit-is</i> .	millit-um.
D. <i>flor-i</i> .	flor-ibus.	D. <i>millit-i</i> .	millit-ibus.
A. <i>flor-em</i> .	flor-es.	A. <i>millit-em</i> .	millit-es.
V. <i>flos</i> .	flor-ibus.	A. <i>miles</i> .	millit-es.
Ab. <i>flor-e</i> .	flor-ibus.	Ab. <i>millit-e</i> .	millit-ibus.
Pater.		Rex.	
Sing.	Plu.	Sing.	Plu.
N. <i>pater</i> .	patr-es.	N. <i>rex</i> .	reg-es.
G. <i>patr-is</i> .	patr-um.	V. <i>rex</i> .	reg-um.
D. <i>patr-i</i> .	patr-ibus.	G. <i>reg-is</i> .	reg-ibus.
A. <i>patr-em</i> .	patr-es.	D. <i>reg-i</i> .	reg-es.
V. <i>pater</i> .	patr-es.	A. <i>reg-em</i> .	reg-ibus.
Ab. <i>patr-e</i> .	patr-ibus.	Ab. <i>reg-e</i> .	reg-ibus.

It will be noticed that nouns like *pater* drop the *s* between the *t* and *r* in all cases except the nominative and vocative singular, while nouns such as *rex* change the *x* to *g* or *c*, as *jud-*x**, *judicis*; *dux*, *ducis*; *radix*, *radicis*, etc.

There are a number of nouns of this declension in *os*, genitive *atis*, of Greek derivation, that are masculine and are declined as follows:

Sulphas.		Citras.	
Sing.	Plu.	Sing.	Plu.
N. <i>sulphas</i> .	sulphat-es.	N. <i>citras</i> .	citrat-es.
G. <i>sulphat-is</i> .	sulphat-um.	G. <i>citrat-is</i> .	citrat-um.
D. <i>sulphat-i</i> .	sulphat-ibus.	D. <i>citrat-i</i> .	citrat-ibus.
A. <i>sulphat-em</i> .	sulphat-es.	A. <i>citrat-em</i> .	citrat-es.
V. <i>sulphas</i> .	sulphat-es.	V. <i>citras</i> .	citrat-es.
Ab. <i>sulphat-e</i> .	sulphat-ibus.	Ab. <i>citrat-e</i> .	citrat-ibus.
Boras.		Plural.	
Singular.			
N. <i>boras</i> .		borat-es.	
G. <i>borat-is</i> .		borat-um.	
D. <i>borat-i</i> .		borat-ibus.	
A. <i>borat-em</i> .		borat-es.	
V. <i>boras</i> .		borat-es.	
Ab. <i>borat-e</i> .		borat-ibus.	

Neuter nouns are declined with the same endings, but it must be observed that in neuters, the nominative, accusative and vocative singular are alike, and the same cases in the plural always end in *o*.

The neuter *chloa* is thus declined:

Singular.	Plural.
N. <i>chloa</i> .	chloa-a.
G. <i>chloa-lis</i> .	chloa-um.
D. <i>chloa-l-i</i> .	chloa-ibus.
A. <i>chloa-l</i> .	chloa-a.
V. <i>chloa-l</i> .	chloa-a.
Ab. <i>chloa-l-e</i> .	chloa-ibus.

Exercise—Decline the following nouns: *Arsenas*, *atis*; *calx*, *-tis*; *confectio*, *-onis*; *emulsio*, *-onis*; *iris*, *-idis*; *juglaus*, *-andis*; *pars*, *-tis*; *pepo*, *-onis*; *lac*, *-tis* (neuter); *theobroma*, *-atis* (neuter).

Adjectives of the third declension have but two forms, as the masculine and feminine forms are the same.

Mitis is thus declined:

Mas. and Fem. Neuter.	Plural.
N. & V. <i>mitis</i> .	mitis.
G. <i>mitis</i> .	mitium.
D. <i>miti</i> .	mitibus.
A. <i>mitem</i> .	mitibus.
Ab. <i>mita</i> .	mitibus.

Present participles are declined like adjectives of the third declension, and have ajective uses, modifying nouns and themselves being modified as verbs. The present participles of the verbs already given are *sonans*, *misens*, *ducens* and *vivens*.

The declension of one will serve as a model for all, as the only change is in the characteristic vowel.

Ducens.	Plural.
Mas. and Fem. Neuter.	
N. & V. <i>ducens</i> .	ducens.
G. <i>ducens</i> .	ducens-ibus.
D. <i>ducens</i> .	ducens-ibus.
A. <i>ducens-em</i> .	ducens-ibus.
Ab. <i>ducens-e</i> .	ducens-ibus.

The stem of all present participles ends in *t*, as: *Sanant, miscant, ducent, venient*.

Exercise: Decline the following adjectives and participles: *Levis, nobilis, bulliens, vehemens, prudens, hilaris, praesens, remittens, solidus, a-um, vegetabilis*.

We would repeat a former statement and urge that particular attention be given it, viz., that the student carefully ascertain the stem of the word found by dropping the *is* of the genitive singular, to this stem add the case endings and the cases will be readily formed without mistakes.

Neuter Nouns and Special Forms.

The three neuters following will exemplify a class of nouns that take *i* in the ablative singular instead of *e*, and *ium* in the genitive plural instead of *um*. These changes are also characteristic of nouns of this declension whose stems end in *i*.

Mare, sea.	Animal, animal.	Calcar, spur.
Singular.	Singular.	Singular.
N.V. mare.	N.V. animal.	N.V. calcar.
G. maris.	G. animalis.	G. calcaris.
D. mari.	D. animal.	D. calcar.
Ac. mare.	Ac. animal.	Ac. calcar.
Ab. mari.	Ab. animal.	Ab. calcar.
Plural.	Plural.	Plural.
N.V. maria.	N.V. animalia.	N.V. calcaria.
G. marium.	G. animalium.	G. calcarum.
D. maribus.	D. animalibus.	D. calcaribus.

The following have special forms: *Bos, M. and F., ox, cow; nix, snow; vis, force; senex, old man.*

Bos.	Nix.	Vis.	Senex.
Singular.	Singular.	Singular.	Singular.
N.V. bos.	N.V. nix.	N.V. vis.	N.V. senex.
G. bovis.	G. nivis.	G. vis.	G. senis.
D. bovi.	D. niv.	D. vi.	D. seni.
Ac. bovem.	Ac. nivem.	Ac. vim.	Ac. senem.
Ab. bove.	Ab. nive.	Ab. vi.	Ab. sen.
Plural.	Plural.	Plural.	Plural.
N.V. boves.	N.V. nives.	N.V. vires.	N.V. senes.
G. bovum.	G. nivium.	G. virium.	G. senum.
Ab. bove.	Ab. nivibus.	D. viribus.	D. senibus.
Ac. boves.	Ac. nives.	Ac. vires.	Ac. senes.
Ab. boves.	Ab. nivibus.	Ab. viribus.	Ab. senibus.

The regular comparative degree of adjectives is declined like nouns of the third declension, as *levior*, the comparative of *levis*, light, is thus declined:

Singular.		Plural.	
M. and F.	Neuter.	M. and F.	Neuter.
N.V. levior.	levius.	N.V. leviores.	leviora.
G. levioris.	levioris.	G. leviorum.	leviorum.
D. leviori.	leviori.	D. levioribus.	levioribus.
Ac. leviolem.	levius.	Ac. leviores.	leviora.
Ab. leviole, or l.	leviore, or l.	Ab. levioribus.	levioribus.

Adjectives have three degrees of comparison, positive, comparative and superlative. These are formed regularly by the change in terminations, by the use of adverbs, as in English, or irregularly by a change of the word itself, like *good, better, best* in English.

The regular comparison is formed by adding to the stem of the positive the following endings:

Comparative.	Superlative.
Mas. Fem. Neu.	Mas. Fem. Neu.
lor. lor. lus.	lissimus. lissima. lissimus.

Levis, levior, levissimus, light, lighter, lightest.

Altus, altior, altissimus, high, higher, highest.

The comparatives thus formed are declined like *levior*, above; the superlatives are declined like *purus*, of the first and second declension. Adjectives ending in *er* have regular comparatives, but add *rimus* for the superlative, as, *acer, acrior, acerrimus*, sharp, sharper, sharpest. Six adjectives ending in *ilis*, have regular comparative, but add *limus* to the stem to form the superlative, as *facilis, facillior, facillimus*, easy, easier, easiest.

THE DANGER IN THE USE OF MALE FERN PREPARATIONS is emphasized in a recent article in *W. Med. Press*. Particular stress is laid on the following points. The oleoresin must always be made from fresh rhizomes, preferably collected in the autumn. The German rhizomes are to be preferred to those grown in other countries. Castor oil should not be given in conjunction with male fern, either before or after, but other laxatives, preferably bitter-waters, should be administered. With anemic, badly nourished or youthful patients a close watch must be kept for toxic symptoms. When the symptoms are light, it is sufficient to discontinue the administration of male fern; for heavier

Some are compared by prefixing the adverbs, *magis*, more, and *maxime*, most, to the positive: *Arduus, magis arduus, maxime arduus*, arduous, more arduous, most arduous.

Many are irregular in their comparison, and the forms must be learned by practice. Some of the more common are given below:

Bonus, mellor, optimus, good, etc.
Malus, pejor, pessimus, bad, etc.
Magnus, major, maximus, great, etc.
Multus, plus, plurimus, much, etc.
Parvus, minor, minimus, small, etc.

Exercises: *Homo est tristis. Muller est tristior. Puella est tristissima. Canis animal nobile est. Bos pinguis est gravis. Sapo vultus depurat. Adjutor calcem gravem pessavit. Phthisis est aegrotatis crudelis. Vir vinum dulce potavit. Phalaena est fragilis.*

The quality is good. The fever is great. He has violent convulsions. The stone is heavy. The change has been wonderful. The doctor is greater. Mix the mustard and the yellow dock. A great change is most desirable. The dog wants meat. The sweet apple was ordinary.

VOCABULARY.

Nouns and Adjectives of the Third Declension.

Adjutor, -oris, clerk.	Ignis, -is, fire.
Aegrotatio, -onis, sickness.	Jecur, -coris, liver.
Aer, -aeris, air.	Lapis, -idis, stone.
Aether, -is, veridigia.	Limon, -onis, lemon.
Ac, -acris, brass, bronze.	Mixis, -is, liquor; fluid.
Agro, -eris, eris.	Magnitudo, -onis, size.
Agrestis, -e, adj., wild.	Mens, -is, mind.
Albumen, -inis, albumen.	Miridis, -e, wonderful.
Alcohol, -is, alcohol.	Mors, -moris, death.
Animal, -alis, animal.	Mortalis, -e, mortal.
Anthemis, -idis, chamomile.	Mos, -moris, custom; habit.
Arbor, -oris, tree.	Muller, -is, woman.
Ar, -artis, art.	Mutatio, -onis, change.
Arsenis, -itis, arsenite.	Nasalis, -e, nasal.
Auris, -is, ear.	Nicis, -is, nostril.
Basis, -is, base.	Nobilis, -e, noble.
Berberis, -idis, barberry-tree.	Notio, -onis, notion; idea.
Bile, -is, bile.	Opacitas, -atis, turning cloudy.
Bitartras, -atis, bitartrate.	Ops, -opis, ad; wealth.
Boras, -atis, borax.	Optabilis, -e, desirable.
Bos, -bovis, ox; cow.	Ordo, -inis, order; rank.
Bullens, -entis, boiling.	Os, -ossis, bone.
Calcenatio, -onis, calcination.	Oxalae, -as, oxalate.
Calens, -entis, warm.	Pars, -partis, part.
Calor, -oris, heat.	Pax, -pacis, peace.
Calx, -calcis, limestone.	Pes, -pedis, foot.
Cancer, -cri, cancer.	Pestis, -is, epidemic.
Canis, -is, dog.	Phthisis, -is, consumption.
Cantharis, -idis, cantharis.	Phibis, -e, fat; rich.
Capax, -acis, capacious.	Piscis, -is, fish.
Carbonas, -atis, carbonate.	Pix, -pice, pitch.
Carmen, -inis, song.	Potens, -entis, powerful.
Caro, -carnis, flesh; meat.	Pumex, -inis, pumice stone.
Caulis, -e, cabbage.	Qualitas, -atis, quality.
Chalcitis, -idis, copper ore.	Radix, -icis, root.
Chloras, -atis, chlorate.	Ratio, -onis, reason; plain.
Cleatrix, -icis, scarf.	Rumex, -icis, yellow dock.
Cottio, -onis, cooking.	Sanguis, -inis, blood.
Color, -oris, color.	Sanitas, -atis, health, soundness.
Congestio, -onis, congestion.	Sapo, -onis, soap.
Convulsio, -onis, convulsion.	Sequens, -entis, following.
Cor, -cordis, heart.	Serpens, -entis, snake.
Cruelis, -e, cruel.	Similitudo, -inis, likeness.
Cucumis, -oris, cucumber.	Sinapis, -is, mustard.
Cutis, -is, skin.	Solubilis, -e, soluble.
Debilis, -e, weak; feeble.	Tenax, -acis, tough.
Desiccatio, -onis, drying.	Tenitas, -atis, fineness.
Diagnosis, -is, diagnosis.	Tepor, -oris, warmth.
Digitalis, -is, fox-glove.	Thorax, -acis, thorax, chest.
Dulcis, -e, sweet.	Tristis, -e, sad.
Elegans, -antis, elegant.	Tumor, -oris, tumor.
Error, -oris, error.	Vehemens, -entis, violent.
Fax, -faucis, throat.	Vermis, -is, blater, etc.
Febrix, -is, fever.	Vestis, -is, garment; cloth.
Finis, -is, end; limit.	Vitis, -is, vine.
Fons, -fontis, well; spring.	Volatilis, -e, volatile.
Fragilis, -e, fragile.	Vulgaris, -e, common; ordinary.
Gluten, -inis, gluten; glue.	Zingiber, -is, ginger.
Gravis, -e, grave; heavy.	
Homo, -inis, man.	

symptoms, injections of other, camphor and other ex-citants may be given. The oleoresin contains, in addition to volatile and fixed oils (dilatolol), resin and tannic acid, also felleic acid, which subsides to the bottom of the container in granular form, after standing for some time. Since felleic acid is the chief active constituent of the oleoresin, the preparation should be thoroughly mixed before using. With the freshly made oleoresin this is not required. It has been proposed to use pure felleic acid instead of the oleoresin with a view to a more accurate adjustment of doses, but this can hardly be recommended, as it has not yet been determined whether the acid is the sole active constituent or whether a part of the effect is due to the oil.—(Ph. Post.)

PATENT AND PROPRIETARY MEDICINES IN FOREIGN COUNTRIES

From the Special Consular Reports on The Drug Trade in Foreign Countries, recently issued by the State Department, the following facts relative to proprietary medicines have been abstracted and arranged by countries:

Austria-Hungary.—The sale of any nostrum or arcadium is strictly prohibited, and proprietary medicines may be sold only if their ingredients and the manner of compounding them have been made known. Such medicines cannot be purchased without a physician's prescription, unless they have been designated as "harmless" by the sanitary authorities. Pharmacists sometimes disregard this rule on their own responsibility. Wherever the reasonableness of the price of a proprietary medicine is questioned it is rated on the basis of the official tariff promulgated in the Austrian pharmacopoeia.

Belgium.—The law requires that the composition of proprietary medicines shall appear upon the label, but consul Lincoln at Antwerp says this law has not been strictly enforced during late years. Consul Morris of Ghent, says: "During my residence here I have been impressed with the difficulty of obtaining many familiar medicinal preparations. There seems to be scarcely any better index of the differences which exist among nationalities than the medicines which people take and how they take them. In Belgium the physician has a relatively clear field. He is little hampered by the existence of patent medicines. Few people attempt to cure themselves by simple remedies purchased already prepared. A doctor's prescription is considered indispensable. Druggists are interested in keeping out anything which competes with prescription compounding." At the same time Mr. Morris believes that many of the American proprietary remedies could be introduced through the "druggists" who are not chemists, but sell the commoner drugs and bottled preparations such as are found in American drug stores.

Denmark.—Consular reports do not mention any restrictions upon this line of goods, and consul Blom, of Copenhagen, mentions several American proprietaries which are sold in that city.

France.—The sale of medicinal compounds or remedies, the ingredients of which are only known to the proprietors, is absolutely prohibited. The inventors or owners of such remedies must communicate the recipe of their preparations with a list of diseases to which they are applicable to the Minister of Commerce. The National Academy of Medicine then examines the composition, and suggests if the compound is worthy of a proper price to pay the inventor for his secret or discovery. Right of appeal exists to another commission, and from these findings and personal representations of the inventor the Minister of Commerce fixes a price to be paid. By ministerial decree a number of foreign preparations are allowed to be sold in France after having been examined by the Ecole Supérieure de Pharmacie at Paris. Foreign proprietaries failing to receive this sanction cannot be imported into France. A list of preparations allowed entry is published and sold by the director-general of customs, entitled "Notes Explicative du Tableau des Droits de Douane." (Vol. 2.)

Germany.—The use of patent medicines is greatly discouraged by the German Government, and every notice or advertisement of this class of preparations must distinctly embrace an accurate analysis of the ingredients or component parts used in such preparations. The lists of American drugs imported into Germany as given by consuls in the various cities show quite an assortment of representative American "patents" which are sold in the Empire. The consul at Mannheim states that special permission must be obtained from the Minister of the Interior for the purpose of dealing in or selling proprietary preparations.

Italy.—Consul McElrath at Turin says: "There is no legal restriction of the sale of patent medicines; any one may deal in them, either at wholesale or retail. The duties to which this class of goods is subject are so heavy as to render it necessary to charge a price higher than the usual printed price of the article in the United States." Among the laws in force in Sicily is the following: "Proprietary medicines, secret, the ingredients of

which possess well established therapeutic properties, and the chemical composition of which the inventors or proprietors, for private gain, wish to keep for themselves, can only be sold after having obtained the approval of the superior sanitary council, and can only be sold by pharmacists. Special preparations, the therapeutic actions of which are known, may be put up by any pharmacist, but must always bear a full and complete formula upon the receptacle without any secrecy or misleading statements."

The Netherlands.—Consul Listoe at Rotterdam reports that some of the best known American patents are sold there. Patent medicines are usually handled in separate stores, but few being kept by druggists. There are two patent medicine stores in Rotterdam.

Russia.—Consul Holloway at St. Petersburg, reports that no proprietary medicines are manufactured or sold in Russia.

Spain.—Articles 16, 17 and 18 of Chapter II of the Pharmacy Law are as follows: "The sale of secret remedies, especial, specific, or preserved, of unknown composition, is absolutely prohibited, no matter what may be the denomination. Equally is prohibited the introduction and sale of all remedies or medicines, both simple and compound, of foreign origin, which have not been registered in the customs tariff. In order to have a remedy registered, which will be authorized by the Minister of the Interior, an application is required of a professor of medicine or pharmacy, accompanied by two copies of the formula of the foreign medicine. In order to decide as regards the application, it will be necessary to have the opinion of the Royal Academy of Medicine at Madrid and a statement relative to the subject from the sanitary council."

The consul at Malaga reports that American proprietaries can be purchased at nearly every drug store, and the consul at Corunna furnishes a list of those sold in that city.

Switzerland.—Proprietary medicines are handled almost exclusively by pharmacists, although druggists are allowed to sell them. But the demand for them is limited. The consul at Geneva gives a list of those of American manufacture obtainable in that city, but states that out of fifty-seven establishments only four keep them in stock at all.

Turkey.—No patents are granted for pharmaceutical or medical preparations or inventions, and no proprietary preparations are allowed to be imported unless a copy of the formula, duly certified by the proper authority is filed with the Imperial School of Medicine at Constantinople.

United Kingdom.—The sale of patent and proprietary medicines is unrestricted except in cases where they may be subject to the provisions of the poison law, and all such goods require revenue stamps. The trade is not confined to pharmacists, but is also engaged in by large stores, groceries, etc.

Egypt.—There are no restrictions of the sale of patent or proprietary medicines, and they are sold in both drug and other stores.

Costa Rica.—The Government commission retains the right at all times to determine what medicines of those called patent may be freely sold, and those of which the sale is absolutely prohibited as being injurious to health, whether their composition is known or not.

Mexico.—There are no restrictions of the sale of proprietary remedies, and they are frequently handled by other than drug stores.

Guatemala.—Judging from appearances, there are no barriers to the sale of proprietaries, and their sale is not confined exclusively to pharmacists, but there is a law forbidding pharmacists to sell secret remedies or specifics. Sales of such articles are authorized by the academy of medicine, after presentation of formula and oral examination.

Honduras.—American proprietary preparations are largely sold, both by druggists and dealers in general merchandise.

British Honduras.—American proprietaries are in good demand, and are sold both in drug and general stores.

Nicaragua.—A greater part of the proprietary preparations sold are of American manufacture.

Salvador.—Most of the proprietaries are American and are sold by druggists.

Cuba.—The sale of patent or proprietary medicines is

not restricted, and American goods are well represented in the stocks of druggists.

Curacao.—The sale of proprietaries is not restricted, and both drug and general stores handle them.

Dominican Republic and Haiti.—There are no restrictions to sale of proprietaries, and their sale is confined to drug stores.

Argentine Republic.—There are no restrictions to the sale of proprietary preparations.

Brazil.—Samples of proprietary medicines with formulæ must be submitted to the "National Laboratorio dos Analyses," at Rio Janeiro. For each article a special license must be obtained by every one desiring to sell it. The average price of such license is \$25.

In the state of Bahia the following laws govern: "All pharmacists who wish to sell official preparations for their own or foreign invention under any special names have to indicate on the labels the pharmacopœias in which the formulas are inscribed, all these being considered secret remedies. . . . The inventor of any remedy who wants to expose it for sale shall make application for a license to the bureau of hygiene, submit a declaration of the component parts of the medicine, the dose and the disease for which it is intended to be used . . . and shall send a sample of the remedy to the laboratory of the state, where an analysis shall be made and its contents verified.

Should the inventor obtain a license he can expose the remedy for sale, but is prohibited from announcing through papers, signs or circulars the therapeutic qualities of medicines which have not been approved or admitted by order of the inspector.

Chile.—The sale of proprietary preparations is not restricted and they are handled by both pharmacists and general stores.

Colombia.—The trade in proprietaries is practically unrestricted and "patents" are sold in nearly all stores, although there is a law forbidding the sale of "secret" remedies except upon physicians' prescriptions.

Ecuador.—There are no restrictions in the sale of proprietaries, and they are handled by pharmacies and general stores.

Paraguay.—The sale of secret remedies is allowed upon authority of the medical council, to which formula and sample must be submitted. The trade is confined to regular drug establishments.

Uruguay.—The trade is not restricted, and several standard American proprietaries are in the market. Medical fees are high, and there is an increasing demand for household remedies and proprietary medicines.

Venezuela.—The trade in proprietaries is unrestricted, and such goods are sold both in pharmacies and general stores.

British India.—Proprietary articles are unrestricted, and are almost exclusively sold in drug stores.

China.—There are no laws regulating the sale of drugs, and anyone may engage in the business.

Dutch India.—There are no restrictions bearing upon the trade in proprietaries but the consul at Batavia reports that he has seen no American "patents" there.

Hong Kong.—The trade in "patents" is not restricted and drug stores sell "everything from whiskey and musical boxes to soda water and candy."

Japan.—No medical compounds can be imported or sold if decided to be deleterious. "Representatives of American drug firms have canvassed the market, but have not succeeded in opening up a promising trade outside of the small supplies required by foreign residents."

Persia.—Anyone can carry on a drug business, but the consul at Teheran says that he cannot find that any American drugs or proprietary preparations are imported.

Korea.—There are no drug laws, and about the only drugs imported are quinine and santalin.

Turkey in Asia.—At Smyrna proprietary articles are forbidden entry unless formula is furnished. This is rarely complied with and the demand is supplied through smuggling. At Sivas certain proprietary preparations are prohibited by the authorities at Constantinople.

New South Wales and New Zealand.—The well-known American proprietaries are extensively sold, both by pharmacists and general stores.

Hawaiian Islands.—The trade in proprietaries is not restricted and the business is confined to the regular drug stores.

PETITION OF THE PROPRIETORS OF AND DEALERS IN PROPRIETARY MEDICINES, INCLUDING THE WHOLESALE AND RETAIL DEALERS IN DRUGS, OF THE UNITED STATES.*

The undersigned, representing the industries mentioned, hereby earnestly petition your Honorable House of Representatives and Senate of the United States, that the War Tax upon Proprietary Medicines may be promptly or speedily revoked, for the following potent and valid reasons:

I. Because it is founded upon entirely erroneous ideas as to the origin and value of these medicines, the general or prevalent idea being that these medicines are more nostrums, the outcome of ignorance and greed, for gain; and that they are of no value as curatives for disease and are deserving of no legal recognition.

Whereas the real fact is that they, to a very large and almost universal extent, are the best and most successful prescriptions of our most advanced and successful physicians. The story is simple. The physician, and the most eminent he may be the most likely this result is to happen, sends his prescription to his druggist, who carefully prepares and sends it to the patient; this is followed by others, and others, all made of the same ingredients and the same proportions, and they are largely or even eminently successful. The druggist is alive to this—he knows from his own observation that he has in his hand a cure for a certain definite form of disease, and gives it a name and launches it upon the public as a remedy for a certain form of disease.

There is nothing of ignorance or mendacity or illiberality in the transaction; the druggist has really rendered the public a service, and has only taken advantage of the opportunity which his trade offered him, and has given wings to a blessing for the people; nineteen-twentieths of the popular medicines of the day have this origin and deserve respect rather than opprobrium.

II. These preparations or medicines become very largely the refuge of the working-class and of the self-respecting poor; not the degraded poor, who crowd the dispensaries or form the inmates of hospitals, but of the laboring, careful, saving class, who are illly able or cannot afford the pay of the regular physician, who from his high fees is regarded rather as the luxury of the rich than as the refuge of the poor; and hence this self-respecting, laboring class from a very large percentage of the patrons of proprietary medicines, which they regard as their most ready, safe and prompt rescue in case of disease or illness.

III. This War Tax is also founded upon very extravagant and popular ideas of the profits of the business. This may be illustrated by a short anecdote: a conversation was in progress between a venerable Congressman and a proprietor. The latter was laboring to show that the Stamp Tax was oppressive, when the Congressman said, "Why, here is your 25-cent box of pills, and it has not cost you over four cents to make it, and on every box you thus make 21 cents." "Oh," said the maker, "I sell them for \$10 a gross, which is 11 cents each;" and it is quite probable that the Congressman only echoed the popular opinion.

It occurs to the writer to say that the ideas which now prevail among Legislators respecting the origin, value, business and profits of the proprietary medicine trade are widely prevalent and have met with little change during the last thirty or more years.

It fell to the lot of the writer to be one, and I think the only survivor, of the five who were sent as deputies to meet and confer with the Committee of Ways and Means of the House of Representatives of 1891, of which the Honorable Thaddeus Stephens was chairman.

They had arranged a tax of two, four and eight cents upon the 25c., 50c. and \$1 vials or packages of medicine.

When this announcement was made, our answer was, "But, Gentlemen, you must remember that we, the makers and taxpayers, only get one-half of the sum which the consumer pays." This was received with some degree of incredulity, but when the proofs were shown

* Read at the annual meeting of the Proprietary Association of America, St. Louis, Oct. 17-20, 1898.

the tax-rate was reduced just one-half, with this remark of Chairman Stephens: "Gentlemen, the country is in peril—you and every industry must respond. When the war is over, your claims will be respected." Yet, in view of all this the tax was continued for twenty years.

But let us return to the stubborn fact, which is, that in the medicine business, as in almost every form of industry, the maker gets usually only one-half of what the consumer pays. The middle-men, the dealers get the entire first half. Then the maker pays, his first advertising, and I think it may be safely stated that the 20,000 publications of the United States make more money from advertising the proprietary medicines, than do the proprietors themselves, and this has been, and probably will always be, the case. It is the common experience of proprietors to pay for advertising each year, from one-half to two-thirds more than they can save from the results or profits of their business. The usual or common result is that of their receipts one-third to one-half goes for advertising, for new business often more, and for the old and established probably less. Another third of all receipts must go for material and taxes and business expenses. So that, as a general rule, the maker will rarely get more than one-tenth or one-eighth of what the consumer pays, if he gets anything.

As to the results of the tax of 1861 and 1863, only the old and long established proprietors saved any money, while hundreds of younger and weaker, but yet deserving and worthy, proprietors were crushed out of existence.

IV. We beg you to consider that this is a special and particular tax, and is over and beyond all other taxes and demands for money which every citizen must pay. It is levied upon a beneficial and widely employed and useful industry. It was levied for the support and maintenance of a war which was patriotic and successful, and has come to a speedy and righteous conclusion, and we trust that the wisdom and foresight of the makers of it will promptly remove it. And the more so as, when the tax is not laid upon the consumer, to whom the tax of one cent upon the trial or box may be nothing, the two and one-half cent tax upon each dollar which is laid upon the retail prices really becomes five per cent. tax upon the maker, as he gets only half of what the consumer pays.

That every citizen has the inalienable right to elect, choose or employ what mode or form of treatment or medication he or his dependents or family shall take or employ, is so palpable as not to require discussion.

If we have been correct in our delineation and exposure of the reasons for this tax, and also in making it clear that it is a tax upon the medicines of the self-respecting poor, we want to suggest the necessity of this War Tax being terminated at the earliest practicable date.

FREDERICK HUMPHREYS, M. D.

NICKEL PLATING.—The following methods are recommended in *Drog. Ztg.*: To a dilute solution of zinc chloride (5 to 10 p. c.) add sufficient nickel sulphate to form a deep-green solution. Heat this in a porcelain vessel to boiling, immerse the articles to be plated, after thorough cleaning, and boil 30 to 60 minutes, replacing the water as it is vaporized. Then place the objects in water containing a little fine chalk—According to another method the zinc chloride solution is heated in a copper kettle, acidulated with hydrochloric acid, powdered metallic zinc added and finally nickel chloride or potassium nickel sulphate, until the solution becomes green. In this solution the objects to be plated are boiled with fragments of zinc foil during 15 minutes. The plating is polished with levigated chalk.

EMBALMING FLUID.—Dr. Morau, of Paris, recommends, according to *D. Med. Ztg.*, a solution of 40 Gm. of potassium nitrate and 40 Gm. of potash in 1 Litre of glycerin. This is injected into the aorta until a slight swelling is noticeable on the surface of the body.—*Südd. Ap. Ztg.*)

See first editorial page for special subscription offer. The remaining issues of the Era for this year are given free.

THE STUDY OF MATERIA MEDICA AND THERAPEUTICS.*

BY HENRY M. BRACKEN, M. D.

The object of study is twofold: first, to train the mind; second, to give the student knowledge that he can make practical use of. In this age of utilitarianism, the first object is often lost sight of. Teachers of medicine and surgery may even speak of the study of materia medica as useless. Their opinion is based upon the fact that the older one is in the practice of his profession the smaller will be his list of therapeutic agents. They argue that a student will pick up the necessary knowledge relating to important drugs, in connection with his clinical studies. This is certainly a mistake. The best therapeutists are men who are thinkers, not machines. The practitioner who uses a therapeutic agent because he was trained to do so by his clinical teacher in his student days, will soon become a back number. The agent may have been the best of its kind in his student days, but the rapid progress that is now possible in therapeutic knowledge may soon displace supposed valuable products by others which prove themselves of greater value. Therapeutic knowledge is becoming more exact each year, and this is due largely to the work of the pathologist and the physiologist.

There are three methods of teaching materia medica: by lectures; in the pharmaceutical laboratory; in the physiological laboratory. It is quite common for a school to adopt one or the other of these three methods, to the exclusion of the other two. This is a mistake. No student should commence the study of materia medica unless he has had at least a year's work in chemistry and physiology. This would prepare him to understand the terms that are in constant use in the study of drugs. The lecture room is the place to begin the study of materia medica. The process here is one of general instruction, of bringing together the important chemico, physiologic and pharmacologic facts. Drugs that have little value can be described briefly by the lecturer, and then receive but little further consideration by the students—possibly never to be thought of again, or possibly be brought out and used to good purpose at some future opportune moment. The important drugs should be given due prominence by the lecturer. It would be hard for the student to grasp the necessary points connected with the study of drugs were he to depend upon his own judgment, but a few words from the lecturer should make the way clear to him. Without such help the student would have to wade through a mass of material, and would be unable to separate the wheat from the chaff. For example: consider the study of opium. Without a guide a student would be thoroughly confused by the number of active principles and pharmacologic preparations. Let the lecturer go over this subject with his class, drawing attention to the fact that a knowledge of a few of these preparations is quite sufficient; that, in fact, it would be no great loss if one knew nothing of the opium preparations, provided his knowledge of morphin was accurate. The use of any opium preparation is to secure the action of morphin, so that direct dosage with morphin should be more satisfactory in every way than the use of opium in any form. So also with the preparations of iron. The uncertainty as to the true therapeutic explanation of the action of iron, together with other bases for theories, has been an excuse for introducing a remarkable list of preparations, official and non-official. The student is quite embarrassed by this display of titles. A few words from the lecturer, however, may reduce this confusion of the iron preparations to a few simple principles—stability, local action, remote action, etc.—and thus make the actual knowledge required an easy matter. All these points are as easily given, by lecture, to a room full of students as to small sections of a class. There is also a great saving of labor by this method. The lecturer thus paves the way for the laboratory instruction. In laboratory instruction, pharmacologic work should be taken up first. This should be taught by a medical man with a pharmacologic training, rather than by a pharmacist with a medical training; otherwise the pharmacologic knowledge

*Presented to the Section on Materia Medica, Pharmacy and Therapeutics, at the Annual Meeting of the American Medical Association, held at Denver, Col., June, 1898. (*Jour. Am. Med. Ass'n*).

Imparted to medical students is apt to be overdone. The teaching should be most practical. The course must necessarily be short, for there are many other important things to take the student's time. The medical student does not need to be a pharmacist, but he must have sufficient pharmaceutical knowledge to enable him to write prescriptions intelligently.

After the pharmaceutical training, the student is ready for the physiologic laboratory, where he may study drug action. This should be the most interesting part of his work in materia medica. It is the most difficult part for the instructor. The work must be done by the class in small sections. The experiments, even in the hands of trained men, are often failures, for one reason or another. This work often takes a great deal of time and yields very poor return from the student's standpoint. The study of the physiologic action of drugs is by no means a simple task, and it is an open question whether it might not be better for the general medical student to accept the conclusions of some eminent physiologist, as to the physiologic action of drugs, rather than to demonstrate such action for himself. It is a question whether the study of drugs in the physiologic laboratory should not be limited to demonstrations, by the instructor, of a few important truths. It certainly is a question whether the student's individual work along this line should not be classed with the advanced work of the senior year, if taken up at all. He may then be able to apply his combined student's knowledge to the task before him. It is even a question whether the special physiologic laboratory study of drugs should not be made an elective course, so that only those who have a special liking for such work would take it up.

Thus we have the work of the lecturer and of the laboratory instructor combined. The lecturer is an educator in the broadest sense; the laboratory instructor is a practical demonstrator, more important, in a way, than the lecturer, but more restricted in his work.

The student is now prepared to take up his work in therapeutics. This naturally comes in the third year of a four years' course. Therapeutic agents are best studied first in groups, according to action, as anodynes, antipyretics, analgesics, etc. The demand for a therapeutic agent naturally suggests one of these groups. In each group there will probably be but three or four important therapeutic agents. The student learns naturally, through this arrangement, to eliminate those that are unimportant. At the same time a little reasoning will enable him to appreciate the advantages one agent may have over another of the same group, in any given case. It will also prepare him for the necessity, which sometimes arises, of changing from one agent to another of the same group, under certain conditions, in order to secure the best drug effect, and at the same time, to avoid establishing either a drug tolerance or a drug habit. When the student learns his therapeutics in this way, he will have little inclination to become a prescription copyist, and his tendency will be toward the writing of simple prescriptions, rather than toward polypharmacy. In this system of teaching therapeutics, it becomes unnecessary for the instructor to devote time to the therapeutics of each and every drug separately. He gives, in common, the points to the whole group, and then points out the advantages and disadvantages, the importance or the uselessness, of each agent in the group. Naturally, he would devote a considerable time to the therapeutic properties of the important agents. In connection with this course, the student must become familiar with prescribing. Three methods of using drugs are now in vogue: the hypodermatic method; the bedside dispensing of drugs; the use of prescriptions. The student would readily become familiar with the first and second methods. The third method is a little more difficult to follow. Instructions should, therefore, be given in prescription writing, drawing attention, not only to the action of the drugs prescribed, but to the form of prescription, compatibility of parts, both chemically and physiologically, and last, but not least, if the prescription is for internal use, its palatability. This work should place the student in good form for his duties at the bedside.

The work that I have so far outlined, as belonging to therapeutics, should occupy time extending through the third year of a four years' medical course. In the senior, or fourth year, the work in therapeutics should be con-

tinued, but along very different lines from those pursued during the previous year's study. There should now be an application of the knowledge which the student has already acquired. The therapeutic teaching should be connected with clinical work. It is not enough to study a case simply to arrive at a diagnosis. That may satisfy the physician's curiosity, but it will not satisfy the patient. Something must be done to cure the patient, if possible. If this is not possible, it is at least necessary to do all in one's power to guard against complications, to pilot the patient through to a safe termination of his troubles, or to at least produce euthanasia when dealing with those cases where death is the only ending for suffering. There are nihilists in therapeutics, but these are men who are not willing to consider the comfort of their patients. We should take great pains not to have any therapeutic nihilists among our students. The instructor in therapeutics for this final work should be a clinical teacher, one who appreciates the points I have just referred to as bearing upon the comfort of his patients.

I have thus outlined the teaching of materia medica and therapeutics to extend over a period of three years. This has not been with the purpose of loading a great deal of work upon the medical student, but rather of giving him a little at a time, in order that he may understand the subject thoroughly. The work could be done in one year, as far as time is concerned, but it would then be simply a process of cramming, and the results could not possibly be satisfactory.

WHAT IS THE BEST TIME TO TAKE MEDICINES?—According to the *Drog Ztg.*, Dr. E. Vogt gives in the *Revue de Therapie* the following elucidations on the most suitable time for taking medicine. Most medicine can be taken any time on an empty stomach, before or after meals. But if an irritating substance is introduced into the stomach, it is important that it be not in too small a volume. If such a body is soluble in water, a highly diluted solution is given; if it is insoluble, it is given with the meal. The form of the drugs is also of importance. Thus hard pills, taken on an empty stomach, may irritate; likewise wafer capsules, whose contents first spread over a limited space in the stomach. But if such capsules, e. g., sodium salicylate, are given with the meal, the contents mix at once with the food and cannot cause any local irritation of the mucous membrane of the stomach. If, however, a prompt action is desired, the medicament is given on an empty stomach, but always diluted, because the stomach is very sensitive to strong solutions. Many have an impediment or retarding action on the digestion, e. g., chloroform, naphthol, saccharin, etc.; therefore it is of importance to administer them when the process of digestion is past or almost so. In this category fall the metal salts, the iodides and bromides, which should be taken with plenty of water on an empty stomach early in the morning or late at night. Mercury salts irritate the mucous membrane of the stomach, therefore they are given in a diluted solution on an empty stomach early in the morning. The author cannot believe that calomel with cooking salt might partly become transposed into sublimite; at any rate, no accidents need to be apprehended from this source. Otherwise strict observation should guard against mistakes. A glass of quinine wine given before the meal causes a slight alcoholic stimulation in the stomach of a child, and one should be careful not to take this for the strengthening effect of the quinine. Therefore, it is better to give such wines after meals. Bitters should be taken the moment one sits down at the table, not half an hour before the meal. It is imprudent to administer cold liver oil before the meal. Why cont. with all the stomach whose walls are expected to exercise an assimilating action? For that reason cold liver oil is given after eating or at least an hour before. Sodium bicarbonate taken before the meal causes too large a secretion of gastric juice. After eating it blunts the excess of acid.

VANADIN is a solution of a vanadium salt and sodium chlorate, proposed by Weber as a specific for pulmonary tuberculosis, in doses of 6 to 30 drops. In addition to its antiseptic properties, the preparation is stated to exert also a favorable influence on the tubercle bacilli. (Ph. Post).

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Queries of Non-Subscribers Not Answered.

(W. M. Jernigan, Marshall, Texas.) Read the rules at the head of this department. The Question Box is maintained for subscribers and their clerks.

Disguising the Taste of Quinine.

(O. I. S.) We know of no better preparations for disguising the bitter taste of quinine than those offered by the National Formulary. See aromatic elixir of yerba santa and aromatic syrup of yerba santa in that work. Other mixtures have been proposed. See under "tasteless syrup of quinine," this Journal, September 29, 1893, page 428, and other issues last year. Consult indexes.

Diluted Alcohol.

(T. W. B.) In the Pharmacopoeia, there is only one preparation known as "diluted alcohol" which is officially defined as "a liquid composed of about 41 per cent., by weight, or about 48.6 per cent., by volume, of absolute ethyl alcohol, and about 59 per cent. of water." It may be prepared by mixing equal volumes of alcohol (91 per cent. by weight) and water. Alcohol of other percentages may be used. See your reference books on practical pharmacy.

Spotting Cigar Wrappers.

(C. T. L. and J. D. B.) We cannot give the formula for the proprietary article. It is said, however, that tobacco leaves used for cigar wrappers may be "spotted" by sprinkling upon them a chlorinated solution like Javelle water or Labarraque's solution. Solutions containing sulphurous acid gas have been similarly recommended. Some months ago an exchange published the following formula for a liquid used in the factories at St. Louis: Sodium carbonate, 3 parts; calcium chloride (chlorinated lime?—Ed.), 1 part; hot water, 8 parts. Put the sodium carbonate in a pot, pour hot water over it, and boil until dissolved. Let boil for 4 or 5 minutes longer, add the calcium chloride, and at once remove from the fire. When cool, decant into earthenware or stoneware jugs, cork tightly, and keep in a cool place. The corks of jugs not intended for immediate use should be covered with a bit of bladder or strong parchment paper, and tightly tied down to prevent the escape of gas, and consequent weakening of the bleaching power of the fluid. The prepared liquid is sprinkled on the tobacco, the latter being then exposed to light and air, when, it is said, the disagreeable odor produced soon disappears.

Hoof Preparations.

(J. W.) The following are from the Era Formulary; we cannot give the formula for the proprietary articles:

1.—A good preparation, and one that will give the horse's hoof a rapid and healthy growth, is to take of oil of tar, 1 pint; beeswax, 1½ pounds; whale oil, 4 pints. The above ingredients should be mixed and melted together over a slow fire, and applied to all parts of the hoof at least once or twice a week.

(2) Neatsfoot oil 4 ounces
Turpentine 2 ounces
Oil tar 3 ounces
Oil origanum 1½ ounces

Hoof Ointment.

(1) Suet 100 parts
Yellow wax 20 parts
Black pitch 20 parts
Tar 20 parts
Lampblack 10 parts

2.—Equal parts of wax, olive oil, lard, veal suet, tur-

pentine and honey. Melt the wax, suet and lard with the oil by a gentle heat; remove from the fire and add the honey and turpentine, stirring till cold. When intended to embellish the hoof as well as soften it, it may be colored with lamp black or ivory black.

3.—Should there be any disease of the hoof, as hoof-bound, etc., the following ointment will produce satisfactory results:

Camphor 1 ounce
Balsam of fir 1 ounce
Oil of cajuput 2½ fl. drams
Compound tincture of iodine 3 fl. drams
Oil of turpentine 1 fl. ounce
Lard 5½ ounces

Equinine.

(H. D. L.) Equinine (Euchinin) is a new quinine derivative obtained by the action of ethyl chlorocarbonate on quinine. It is described as a crystalline substance slightly soluble in water, and easily so in alcohol, ether and chloroform. It possesses basic properties, and unites with acids to form crystallizable salts. Regarding the therapeutic use of equinine M. Overbach (Deutsche Med. Ztg.) states that he has used it as an antipyretic in pneumonia, pleuritis, pulmonary tuberculosis, influenza, erysipelas, etc., as well as an antineuralgic and alternative. Among the special advantages that equinine possesses over quinine he mentions its freedom from the intensely bitter taste that the latter has, making it therefore of special benefit in treating children, the absence, when given, of any untoward effect on the stomach in the great majority of cases, whether given in single large doses or continuous small doses, and the absence of any effect on the cerebrum that would cause the ringing in the ears. This ringing in the ears, it was found, might be produced by the first, and possibly by the second dose also, but was always absent after that. This would indicate that no cumulative effects might be expected to follow the use of equinine, which would of course be of considerable value, particularly where repeated large doses are exhibited. He employed equinine in doses of 0.1 to 0.25 gram for weeks in cases of anemia, chlorosis, mixed forms of both, and complications of abnormal conditions of the blood, without any disagreeable symptoms being observed. He also observed in many cases a noticeable increase in the quantity of hemoglobin in the blood, and a very satisfactory increase of the number of erythrocytes to follow the exhibition of small doses of equinine for several weeks, accompanied by an improvement in the appetite and general condition as well.

Equinine may be given to adults enclosed in cachets, and to children in milk, soup or cacao. The tannate of equinine is perfectly tasteless, while the hydrochlorate is said to have a disagreeable taste, and would therefore, seem to have no advantage over the ordinary quinine salts.

Rights of Physicians and Pharmacists.

(H. C. G.) asks what more right has a physician to prepare and dispense medicines without a diploma of pharmacy than has a pharmacist without a doctor's diploma to call on and treat patients?

The possession of a diploma by either physician or pharmacist does not always confer upon either the legal right to practice his particular profession let alone the practice of the other's profession by either. This is especially true in those States where all applicants for registration as physicians or pharmacists are required by law to pass an examination regardless of the diplomas they may hold. The possession of a diploma as a graduate of some medical school is generally held to be a pre-requisite to such examination for registration as a physician. In but few States is the graduate in pharmacy allowed to register upon his diploma. All applicants for registration as pharmacists are required to pass the examinations. Now, we hold that the legally qualified physician as such has no right to practice pharmacy, although in a few States we believe, he may register as a pharmacist by virtue of his certificate of registration as a physician. His right to prepare and dispense his own medicines has never been questioned by legal authority. If he has the legal right to practice medicine he certainly has the right to supervise all the various means necessary in his treatment of disease. Theoretically, any restriction or abridgement of this right would handicap and

prevent him from following the dictates of his own good judgment. There are circumstances in which the duties of the physician and of the pharmacist merge, but such a combination of duties is practically foreign to modern conditions. Pharmacy covers a field of nearly as much importance, breadth and difficulty as that of medicine itself and requires as special, extensive and thorough a preparation. The physician in his education has not been trained as a pharmacist. He may be acquainted with the general principles of pharmacy and know enough of the details of the business to act with safety himself in cases of emergency—and every physician should be thus equipped—but he is not qualified to compound medicines. His province is to diagnose and prescribe. Upon the other hand the pharmacist as such has no right to practice medicine because his training and qualifications have not fitted him for its duties. If he undertakes, without proper qualification, to do that which, by reason of incompetency, difficulty or danger demands special skill, it is obvious that he is not acting as a prudent man, and legal authority must hold him accountable for the usurpation of rights not his own. The same line of reasoning holds with reference to the physician practicing pharmacy. The enforcement of these principles is necessary to the welfare of society. The duties of both physician and pharmacist in relation to each other and to society are marked out by obligations upon which must be based the practical disposition of all questions of "life, liberty and the pursuit of happiness." Neither physician nor pharmacist has the moral right to practice that profession for which he has not been trained.

Almond Cream.

(D. & W. B. P.) Dieterich gives this formula:

Spermaceti	2	ounces
White wax	2	ounces
Sweet almond oil	14	fl. ounces
Water, distilled	7	fl. ounces
Borax, powder	60	grains
Coumarin	5	grain
Oil of bergamot	24	drops
Oil of rose	6	drops
Oil of bitter almond	8	drops
Tincture of ambergris	5	drops

Melt the spermaceti and wax, add the sweet almond oil, then incorporate the water in which the borax has previously been dissolved, and finally add the oils of bergamot, rose and bitter almond.

Here are some formulas for creams containing sweet almond oil in emulsion or saponaceous form:

(1) Ointment of rose water	1	ounce
Oil of sweet almonds	1	fl. ounce
Glycerin	1	fl. ounce
Boric acid	100	grains
Solution of soda	24	fl. ounces
Mucilage of quince seed	4	fl. ounces
Water, enough to make	40	fl. ounces
Oil of rose, ...		
Oil of bitter almonds, of each, ...		
sufficient to perfume		

Heat the ointment, oil and solution of soda together, stirring constantly until an emulsion or saponaceous mixture is formed. Then warm together the glycerine, acid, mucilage and about 30 fluidounces of water; mix with the emulsion, stir until cold and add the remainder of the water. Lastly, add the volatile oils.

The rose water ointment used should be the "cold cream" of the U. S. P.

(2) Sweet almonds, blanched	5	ounces
Castile soap, white	120	grains
White wax	120	grains
Spermaceti	120	grains
Oil of bitter almonds	10	drops
Oil of bergamot	20	drops
Alcohol	6	fl. ounces
Water		sufficient

Make an emulsion of the almonds with water so as to obtain 16 fluid ounces of product, straining through cotton, which has previously been washed to remove starch. Dissolve the soap with the aid of heat in the necessary amount of water to form a liquid, add the wax and spermaceti, continue the heat until the latter is melted, transfer to a mortar, and incorporate the almond emulsion slowly with constant stirring until all has been added and a smooth cream has been formed. Finally add the volatile oils.

(3) Spermaceti	240	grains
White wax	120	grains
Castile soap, white	120	grains

Bitter almonds, blanched	5	ounces
Alcohol	6	fl. ounces
Oil of bitter almonds	10	drops
Oil of bergamot	1	fl. dram
Water, distilled	16	fl. ounces

Triturate the almonds with the water to a smooth paste, melt the spermaceti and wax by means of a water bath, mix the two intimately, slowly add the alcohol in which the oils have previously been dissolved, and finally strain through cheese cloth.

Various other formulas have been published in previous volumes of the Era. Consult the indexes.

PHARMACY.

CREOSOFORM is a combination of creosote and formaldehyde, which is possessed of powerful antiseptic properties.

FLESH-COLORED ZINC OINTMENTS.—Rausch gives the following formula: Red bole, 0.63 gm.; glycerin, 6 drops, zinc ointment, to make 10 gm.—(Ap. Ztg.)

FACE POWDER.—The following formula is given by Unna; Zinc oxide 2, magnesium carbonate 3, white bole 3, red bole 2, rice starch 10 parts. To obtain the powder in a very fine condition, it must be bolted through linen.—(Ap. Ztg.)

PHENOSALYL is prepared according to Sibut by melting together 8 parts of carbolic acid, 1 part of salicylic acid and 2 parts of lactic acid, and adding to the fused mixture 0.1 part of menthol. It is proposed as an antiseptic. (Ph. Post.)

PRASOID is a solution of globularin and globularethin, of which 160 drops contain 0.135 Gm. of the former and 0.153 Gm. of the latter. It is prescribed by Poucel for acute attacks of gout and rheumatism, in doses of 15 to 20 drops three times daily. (Ph. Post.)

FLESH COLORED ZINC JELLY.—Harter's formula: Red bole 0.3, solution of eosin (1:500) 3.5, distilled water 50, gelatin 15, glycerin 10, zinc oxide 25 parts. Weich's formula: Red bole 0.3, solution of eosin (1:500) 3.5, distilled water 55, gelatin 12.5, glycerin 12.5, zinc oxide 20 parts. (Ap. Ztg.)

MALATE OF IRON is prepared by Ceruti from apple juice that has been freed from proteid and albuminous matter by heating. The preparation made from the juice so treated contains uniformly 10 per cent of iron, while the usual methods give products varying as much as 2 per cent, in the quantity of iron present.—(Ph. Post.)

RUBINAT is the name of a Spanish natural bitter-water recently placed on the market. According to an analysis by the Paris Académie de Médecine, it contains principally sodium sulphate, with small quantities of potassium, calcium and magnesium sulphates, sodium chloride and silicates of iron and aluminum. (Drog. Ztg.)

OVALBUMIC ACID is a product obtained by Albahary through the action of iodine and amorphous phosphorus upon powdered egg-albumen suspended in water. The acid is free from iodine and forms a sodium salt that crystallizes in fine needles. The acid separated from this compound melts at 280° with decomposition. It is insoluble in water, but soluble in mineral acids. From its solution in hydrochloric acid, it is precipitated by picric and phosphomolybdic acids, also by gold and platinum salts. (Sudd. Ap. Ztg.)

APHANIZON is a paste for removing spots from clothing, put up in tin tubes containing about 4-oz. A preparation closely resembling it and equally efficacious may be made, according to A. Gawalowski (Ph. Post), from burnt magnesium, exsiccated alum, powdered soap, naphthalin, benzol and alcohol. Powdered sodium stearate may be used instead of soap.

TO RENDER PETROLEUM ODORLESS the following method is recommended: To 5 liters of petroleum add 100 Gm. of chlorinated lime and agitate the mixture thoroughly for some time. Then pour it into another vessel containing unslacked lime and stir again. Let it stand until it becomes clear and decant cautiously from the sediment.—(Südd. Ap. Ztg.)

ANTIPYRINE TANNATE is prepared by mixing aqueous solutions of antipyrine and tannin, which causes the salt to separate as a white, curdy precipitate. This is filtered out and dried at a moderate heat. The product is a yellowish, tasteless powder insoluble in water, and decomposed by acids. It is stated to contain 37 per cent. of antipyrine and 63 per cent. of tannic acid. (Ph. Post.)

LIGNOROSIN is a new reducing agent which is obtained from the refuse of paper factories by the action of calcium sulphite on lignin and consists chiefly of calcium lignate. It is found in the market as a viscous, dark-brown semi-liquid having an odor suggesting that of caramel. It is proposed as a reducing agent for potassium bichromate and is claimed to be a perfect substitute for lactic acid in dyeing establishments.—(Chem. Ztg.)

SUBCUTANEOUS NOURISHMENT WITH OLIVE OIL has been accomplished in the Altona (Germany) Hospital with 28 patients, according to Arch. Klin. Med. More than 500 injections were given. The oil was always used sterilized and warmed to the temperature of the body. The doses varied from 50 to 200 Gm. The experiments proved that nourishment through subcutaneously applied fat in cases of deficient fat formation in the body is entirely rational.

HEROIN, an acetic ester of morphine, is proposed by Dreser as a substitute for codeine in doses of 0.01 Gm. (1-7 grain) in all cases where codeine phosphate is usually prescribed, as a reliable remedy for coughs, pains in the chest, and particularly for catarrhal inflammations of the respiratory tract. It is given 3 to 4 times daily in powders of 0.005 to 0.01 Gm. (1-14 to 1-7 grain) or in aqueous solutions with addition of a few drops of diluted acetic acid. (Ph. Post.)

THE PTOMAINES OF PRESERVED MEATS are, according to van Ermengin (Jour. de Ph.) secretions of a specific bacterium, bacillus botulinus. The toxin, called by the discoverer, "botulin," is so poisonous that 0.000001 Gm. is sufficient to kill a rabbit. Fortunately, the toxin is destroyed by a comparatively low temperature, 60° to 70° C. At 85° the bacillus is also destroyed; cooking is, therefore, a reliable safeguard in the use of salted, smoked, or otherwise preserved meats.

EAU DE BOTOT.—The composition of the well-known Eau de Botot is said by the Seifensieder Zeitung (Br. & Col. Dr.) to be as follows:

Spirits of wine	8,000
Star anise oil	125
Cassia oil	125
Clove oil	63
Tincture cochineal	31
Peppermint oil	31
Quinine tincture	125
Lemon oil	63
Sugar	500

PURIFICATION OF QUILLAYA EXTRACT.—The extract is very slowly evaporated in shallow pans, which causes the resinous matter present to sink to the bottom. The clear liquid is drawn off and slimy substances still present removed by digestion with zinc dust and oxalic or sulphurous acid. The zinc salts so formed are precipitated and carry down with them the slimy matter, while at the same time the extract is bleached through the action of the nascent hydrogen, which is liberated in the reaction.—(Ap. Ztg.)

PYRANTIN is a new synthetic antipyretic, having, according to Plutti, the composition of para-ethoxy-phenyl-nucinidine. Clinical experiments by Giolfredi have

shown that small doses have no effect on the heart and the respiration, and that larger doses diminish the arterial pressure. The antipyretic action is manifested partly by increased elimination of heat, partly by a diminution of the production of heat. Pyrantin is obtained in the pure state in brilliant prisms, which are sparingly soluble in water and ether, very soluble in alcohol and acetic acid. The sodium salt is readily soluble in water, forming a solution of sweetish taste. (Ph. Post.)

PREPARATION OF SANTALOL.—Santalol is the therapeutically active constituent of East Indian sandalwood oil and belongs, chemically, to the group of monatomic alcohols. Its formula is $C_{15}H_{16}O$. The crude oil is warmed in alcoholic solution with caustic alkali on a waterbath; for the saponification of esters. After removal of the excess of alkali by washing with acidulated water, the oil is distilled in a vacuum, in fractions. The odorous portions first pass over, along with sesquiterpenes, then the santalol, the yield being 75 to 80 per cent. of the oil taken. Santalol may also be separated from the oil by distillation with superheated steam.—(Südd. Ap. Ztg.)

SALICYL-ACET-PARA-PHENETIDID is a new antipyretic, which is prepared by heating salicyl-acetic acid with para-phenetidin at about 120° C., until a sample of the mixture dissolves clear in a solution of alkali carbonate. The pure product crystallizes in needles that melt at 182°. It is sparingly soluble in water, alcohol and ether, more soluble in hot alcohol, and is split up into its components by warming with alkalis. Clinical experiments have shown that its action is more favorable and more prompt than is the case with the antipyretics heretofore used. The same is true of the sodium salt, which is easily soluble in water.—(Ap. Ztg.)

PLATING OF ALUMINUM WITH SILVER, GOLD, COPPER OR NICKEL.—The objects to be plated are cleaned with a dilute solution of sodium or potassium hydrate, or with very dilute hydrochloric acid, and then thoroughly washed off with water. The following baths are recommended by Laseigne and Leblanc (Jour. de Ph. et de Ch.) as giving good results:—Silver, silver nitrate 2, potassium cyanide 4, sodium phosphate 4, distilled water 100 parts.—Gold, gold chloride 4, potassium cyanide 4, sodium phosphate 4, distilled water 200 parts.—Copper, copper cyanide 30, potassium cyanide 45, sodium phosphate 45, distilled water 500 parts.—Nickel, nickel chloride 7, sodium phosphate 7, distilled water 100 parts.—The baths are heated to 60° or 70° C., and kept at that temperature. It is also necessary that the anodes consist of the same metal as that contained in the solution.

USE OF ALKALINE SOLUTIONS OF FORMALDEHYDE IN ANALYSIS. (L. Vanino, Ber.)—Gold can be determined quantitatively by adding to its solution as chloride, ordinary commercial formalin, followed by a few drops of sodium hydroxide, and warming for a short time on the water bath. The precipitated gold is filtered (the filtrate being tested with additional formalin and alkali to see that precipitation is complete), well washed with water and alcohol, and either dried at 180° C. or carefully heated to redness in a crucible. The author's experiments (on quantities of chloride varying from 0.1203 to 0.5803 gm., and in fairly dilute solutions) gave results varying from 64.75 to 64.94 per cent., the calculated percentage being 64.92. Silver, in solution as nitrate, can also be determined accurately by the same method, either in the cold or on the water bath; the only precaution necessary is to wash well with absolute alcohol to remove adhering water. Silver chloride is also completely and rapidly reduced by the same reagent, and as a means of preparing pure silver from silver residues. The author promises a further communication on the use of alkaline formaldehyde in analysis, with especial reference to copper salts. (Jour. Soc. Chem. Ind.)

INCOMPATIBILITIES OF ANTIPYRINE.—There is a series of substances, which, when mixed with antipyrine, cause either mutual decomposition, or form compounds having physiological effects differing from those intended

and which may even produce toxic symptoms. The toxic action of a mixture of antipyrine and calomel is well known. The following substances in particular are mentioned as incompatible with antipyrine: With spirit of nitrous ether and with amyl nitrite or other nitriles a green iso-nitroso-antipyrine is formed. On mixing dilute solutions of antipyrine and carbolic acid a precipitate is formed. A mixture of antipyrine and sodium salicylate in powder form changes to a sticky mass after some time. Tannic acid precipitates antipyrine from its solution as tannate. On the other hand, the solubility of quinine, caffeine and their salts in water is increased by the addition of antipyrine.—(Ph. Post.)

FLOWER-SANTALOLS.—Some years ago the firm of Heine & Co., in Leipzig conducted experiments with a view to obtaining a liquid oil of orris root by the distillation of East Indian sandal wood oil with Florentine orris root, but without success, since the powerful aroma of sandal wood to a considerable extent masked the delicate orris odor. The same firm has recently resumed the experiments, but uses instead of the crude oil of sandal wood an oil from which the constituents giving it the specific sandalwood odor have been removed. The odorous constituents are terpenes, aldehydes, esters and sesquiterpenes and the portion remaining after the removal of these is called "Santalol." The success of the new process is complete, as the new product is entirely free from sandalwood odor and the delicate aroma of the orris root is fully developed. The oil so obtained is called "Iris-santalol."—Similar preparations of flower odors of various kinds are also offered under the generic term of "flower-santalols." They include tuberose, violet, hyacinth, orange flower, mignonette, rose, cassia, jasmin and jonquill-santalols. These products are easily and completely soluble in alcohol, and do not precipitate even after long standing. In addition to their value for preparing perfumes, they are also peculiarly adapted to perfuming toilet soaps, since santalol is not acted upon by alkalies (Drog. Ztg.)

SACCHARATED CARBONATE OF IRON IN GRANULAR FORM.—Labier makes the following observations on this preparation in Ph. Post: Saccharated carbonate of iron is described as a greenish gray powder. This applies to the freshly made preparation, and when this is kept in small, well corked bottles sealed with paraffin, the color remains unchanged for some time. In most cases, however, the powder is kept in the stockroom in large receptacles, that always contain a considerable quantity of air, which is renewed whenever the container is opened. The consequence is that through the oxidizing influence of the air the ferrous carbonate is slowly changed to ferric hydroxide and the preparation assumes a brown color. It then loses the properties that are demanded by the pharmacopœias and should be rejected. The oxidation is undoubtedly favored and hastened by the fine state of division in which the salt is directed to be kept, since every small particle of powder is surrounded by a layer of air which causes a more or less rapid change, according to the size of the particles. In view of this, Labier proposes that the pharmacopœias adopt a granular form for this preparation in which only the surfaces of comparatively large particles would be exposed to the action of the air. The granular form is easily prepared, and when it is dried sharply, may be readily reduced to a fine powder as it is required.

PRESERVING BIOLOGICAL SPECIMENS.—The following fluids are recommended by Amann for preserving biological specimens: Lactophenol: Carbolic acid, 20; lactic acid, 20; glycerin, 40; distilled water, 20 parts. Recommended for fronds of mosses, hepaticæ, fungi, analsæ, Lactophenol copper solution: Crystallized copper chloride, 0.2 part; acetate of copper, 0.2 part; distilled water, 95.0 parts; lactophenol, 5.0 parts. For preserving chlorophyll, recommended for Demiacæ, Palmdæ, Conferve, etc. Concentrated lactophenol copper solution: Crystallized copper chloride, 2.0 parts; crystallized copper acetate, 2.0 parts; lactophenol, 95.0 parts; water containing algae is mixed with 10 per cent. of the above solution. The

whole material is preserved thereby for a long time. Lactophenol glycerin jelly:—White gelatin, 85; distilled water 44; glycerin, 30; dissolve by heating on the water-bath, filter and mix with 10 parts of lactophenol. Lactophenol copper glycerin jelly:—Prepared as above, with the substitution of 10 parts of lactophenol copper for lactophenol. Phycocyanin and chlorophyll retain their color excellently in this medium. Lactophenol gum:—A strong solution of gum arabic in water 1, glucose 2, and lactophenol. For preparing mosses for the herbarium. Potassium mercuric iodide glycerin:—The author states that the salt dissolved in concentrated anhydrous glycerin gives a mounting medium of 1.78 to 1.80 refraction index. He recommends the mixture for Diatomeæ. The preparations are rinsed on with amber or dammar varnish mixed with 2 per cent. of boiled linseed oil.—(Pharm. Centr., Sci. Am.)

PREPARATION AND PROPERTIES OF CALCIUM HYDRIDE. H. Moissan. *Comptes Rend.* (Jour. Soc. Chem. Ind.). Calcium is placed in a nickel boat in a glass tube, through which pure hydrogen is passed till all air is expelled. The end of the tube is then sealed and the hydrogen supply kept up under a pressure of 30 to 40 c. m. of water. The tube is gradually heated, and at low redness the calcium takes fire, rapidly absorbs hydrogen, and is converted into a white substance, calcium hydride. Not more than five or six grams of calcium should be contained in a single boat, lest the intense heat cause the metal to alloy with the nickel; but several boats may be contained in series in one tube. The hydride is white, with crystalline fracture; density, 1.7; not sensibly dissociated in a vacuum at 600° C.; not farther affected by hydrogen at the softening point of Bohemian glass; not affected by chlorine in the cold, but decomposed at low redness with incandescence, forming calcium chloride and hydrochloric acid; similarly acted on by bromine or iodine. It does not oxidize in air even at a bright red heat; but at the highest temperature of a blowpipe it burns, forming lime, which fuses and forms a protective coating to the portions beneath. In oxygen it takes fire at a low red heat, and the whole is converted into a fused mass of lime. In sulphur vapor action begins only at a very high temperature, but then goes on vigorously, calcium and hydrogen sulphides being formed. On selenium it has no action, nor has it on nitrogen. Phosphorus at 500° C. decomposes it, evolving hydrogen, and forming a substance which produces phosphine when thrown on water. Boron at 700° C. is without action. Heated with carbon in a brasque crucible to 700° or 800° C., it forms calcium carbide; but neither boron nor silicon has any action under the same circumstances. Potassium or sodium fluoride, at 500° C., acts vigorously, with evolution of hydrogen and vapor of potassium or sodium. Silver fluoride acts violently, even in the cold, giving calcium fluoride and silver, with evolution of hydrogen; and at 400° C. a similar reaction takes place with fluoride of lead or of zinc. Sodium chloride, at red heat, acts very regularly, sodium vapor being given off. Fused potassium iodide does not act on the hydride, but silver iodide acts vigorously. Oxidizers, as potassium chlorate, perchlorate, chromate, or permanganate, are reduced with violence amounting to explosion. Hydrogen sulphide at a red heat forms calcium sulphide and hydrogen, nitrogen dioxide forms ammonia, and carbon dioxide forms carbon and calcium carbide. Strong sulphuric acid, if hot, is reduced by calcium hydride, but strong nitric acid is hardly attacked. Dilute acids act vigorously, forming calcium salts and hydrogen; in the case of hydrochloric acid the action is rapid, whether the acid be dilute or strong. Ethyl alcohol slowly attacks the hydride, but the alkyl chlorides or iodides, benzene, or turpentine, are without action. Carbon tetrachloride vapor at 400° C. acts vigorously, depositing carbon and giving off hydrogen and hydrochloric acid. Water decomposes it violently, forming lime, while the hydrogen both of the hydride and the water is evolved. The interest of this hydride lies in the fact that the hydrogen behaves like a non-metal; the substance is radically different in character from the potassium-hydrogen and sodium-hydrogen alloys of Traut and Hautefeuille, or from Graham's hydrogenized palladium.

THE PHARMACEUTICAL ERA

[WEEKLY.]

The contents of this publication are covered by the general copyright, and articles must not be reprinted without special permission

Vol. XX.

NEW YORK, NOVEMBER 17, 1898.

No. 20.

ENTERED AT NEW YORK POST OFFICE AS SECOND CLASS MATTER

ESTABLISHED 1887.

THE PHARMACEUTICAL ERA.

Published Every Thursday, at 106 Fulton St., New York.
By D. O. HAYNES & CO.

Subscription Rates:

U. S., Canada and Mexico, - - - - \$3.00 per annum
Foreign Countries In Postal Union, - 4.00 per annum.

ADVERTISING RATES ON APPLICATION.

ADDRESS, THE PHARMACEUTICAL ERA,

Telephone: 5315 Cortlandt. P. O. BOX 1483.
Cable Address: "ERA"—New York. NEW YORK.

CHICAGO OFFICE: 194 Randolph St. (Telephone, "Main 733.")

TABLE OF CONTENTS.

PAGE.	PAGE.
EDITORIAL 663	Plans for Meeting of
CORRESPONDENCE 665	American Chemical Society 681
ERA COURSE IN PHAR-	N. A. R. D.: Board of
MACY 667	Trade asks Repeal of
Inorganic Chemistry..... 664	Stamp Tax 682
Pharmaceutical Physics..... 669	American Chemical Society
Alcoholic Preparations.... 672	Meeting 683
Drug Store Advertising... 674	Richmond Pharmacists
Foreign Trade In Patent	Meet: Plans for Chemi-
Medicines 676	cal Club 684
Fluid Acetracts 676	NEWS LETTERS 685
A New Spectroscope..... 671	BUSINESS RECORD 690
Some Incompatibilities... 678	PATENTS, TRADE-
Yucca Plant in Venezuela... 678	MARKS, ETC. 691
QUESTION BOX..... 679	Torrey Botanical Club ... 692
NEWS AND TRADE DE-	STATE OF TRADE..... 693
PARTMENT 681	MARKET REPORTS... 694
Swindlers Again at Work:	

SECOND EDITION OF ERA KEY TO U. S. P.

The sustained demand for this valuable little publication has exhausted the first edition, and a second has been printed. The popularity and sales of this reference work are probably exceeded by those of no other publication issued for pharmacists, as both the latter and members of the medical profession have found that it supplies an omission in giving doses for U. S. P. drugs, chemicals and preparations. In addition, it gives the strength and official and common names of the various preparations. It is useful to the pharmacist in supplying him, in convenient form, with some of the essential features of the U. S. P., and is of service to the physician in familiarizing him with official preparations. Many druggists have found that a complimentary distribution of the book to physicians has resulted in increased specification of preparations of the U. S. P. The new edition is bound only in board covers, imitation pressed leather, and the price remains the same as heretofore, 25 cents per copy, post paid. Special prices are quoted on quantity lots. Address D. O. Haynes & Co., Publishers, Box 1483, New York.

REPEAL THE LAW.

A short time before the meetings of the three branches of the drug trade in St. Louis last month, this journal urged that the several organizations unite upon plans to secure the repeal of the war revenue stamp tax law, so far at least as it bears particular reference to the drug trade and the goods handled by it. The proceedings of the several conventions show that this idea met with very cordial support, for each of them passed resolutions protesting against the injustice of the tax in the first place, its unequal distribution in the second, and its unnecessarily high rate of taxation in the third, and, as the necessary result from all these reasons for protest, each organization announced its intention to work vigorously for the total repeal of the law.

This stamp tax was the cause of arousing the retail druggists of this country to a desire to form a national business organization to look after the retailer's business interests. Had there been on all sides a compliance with the obvious intent of the law, and no attempt had been made to shift it from the shoulders of one to another, there would undoubtedly have been no movement looking to the organization of the retailers. They were aroused, however, by the action of the manufacturers of proprietary medicines, who had selfishly shifted the tax from themselves to the very one who could least afford to stand it, the retail distributor, and it proved the last straw upon the camel's back.

There are many reasons why this tax should be removed from medicines. In the first place, it is not needed, and this surely is sufficient reason alone, without enumerating others. It is said upon unquestionable authority that the revenue from the stamp tax act has thus far immensely exceeded expectations, and is in amount far in excess of the actual needs of the Government. What need of putting the petition for its repeal upon any other ground than this?

The N. A. R. D. has committed itself to endeavors for the attainment of several prime objects. It is first going to see if it cannot have removed from the shoulders of the retail druggist this very heavy stamp tax. If it accomplishes this it will be sufficient glory and sufficient work to justify its creation, and there is no reason why, if the proper sort and the proper intensity of effort be put forth, this cannot be accomplished. The sentiment of the entire drug trade is in favor of repeal, and the influence which can be exerted by manufacturers of proprietary medicines, by wholesale druggists and by retailers cannot be disregarded by politicians and law-makers, and their requests will demand and will receive respectful attention, at the least. But in favor of the success of the movement is the fact that among government representatives themselves exists the feeling that this burden should be lifted from the drug trade, or at least greatly lessened and more equitably imposed. The time is a particularly opportune one, and we shall be disappointed if the earnestness of the N. A. R. D., backed up by the formally expressed wishes of

the jobbers and proprietors in their convention at St. Louis, do not bear the fruition of perfect success, and that in the very near future. An essential step to this end, however, is that the retailers shall present their demand with the force of a united organization. The retailers should be very generally organized into local associations and State associations throughout the country, and each of these should be represented by delegate membership in the N. A. R. D. Those druggists who have heretofore been so blind to their own interests as to refrain from affiliation with any association, remaining content to follow their own selfish purposes, without regard to the interests of the profession as a whole, should be brought to a realization of the evil of their ways and induced to become members of their representative associations. If they neglect this imperative duty, they have only themselves to blame for all the evils which may rest upon them, and of which they so loudly complain. If they want help, they must help themselves. They are not justified in holding out, and then blaming their brother druggists for non-success in any measure looking to the benefit of the whole.

There is no more crying reform necessary than this of the repeal of the stamp tax act. It must be secured, and the retail druggists are the ones to secure it.

SHORT CUTS NOT DESIRABLE.

A correspondent who speaks of himself as a subscriber and student of the Era Course, but who very modestly refrains from giving his address, and whose name cannot be found upon our subscription list, asks us to publish regularly each month the examination questions asked by the New York City Board of Pharmacy. His argument is that this would provide an excellent method for the student to test his own ability, affording opportunity for him to try to answer as many of the questions as possible, and in this way he would know what is expected of him at the examination, and whether he might venture to come up for a trial. He would in this manner ascertain his weakest points, and study up to the mark, and would thus be prepared to stand the examination better than when entirely unfamiliar with the ways of the board, and thus naturally nervous from the start.

There is considerable plausibility about this line of argument, and yet we believe it fallacious. Preparing for board of pharmacy examinations according to this method is merely a gambling matter. The information attained thus is not real knowledge, and affords no fair index to its possessor's attainments as a pharmacist. To be sure, the young man, after he had collected a year's examination questions and studied up answers to each, might be successful in passing the examination, because of the fact that a certain percentage of the questions which he would be asked in the examination had been propounded, though possibly in different form, in previous examinations, and in this way he could manage to skin through. If the sole object of this young man, and others like him, is to secure registration by a board of pharmacy without any reference to the value of knowledge for its own sake, the system is perhaps as good as any for him to attain the goal. It is, however, one which is to be strongly discountenanced, and this kind of applicant is just the sort who should be debarred on all grounds from the practice of pharmacy. Knowledge gained from examination questions is unsystematic, unrelated, useless, parrot-like in all respects.

The publication of examination questions from time to time is, perhaps, not greatly to be frowned upon, but to enter into this publication in the system-

atic way our correspondent requests is something which in our opinion is indefensible and improper. The boards of pharmacy quite generally entertain the same opinion that we do upon this question, and most of them refuse to give out their questions for publication. This is especially true of the board in this city, hence we could not carry out our correspondent's wishes, even if we desired. Our friend is advised to relinquish all attempt to enter pharmacy by the back door, or by a short cut, and to devote his energies to a sound, systematic, educational equipment for his calling. Having secured this, he need fear no board of pharmacy, and he will then be led to see the error of his ways, and agree with us in this criticism and objection to the plan he proposes.

THE DRUGGISTS' LEAGUE IN ITS TRUE COLORS.

The Druggists' League for Shorter Hours, is a misnomer. That name does not give the remotest inkling of the end and object of the organization bearing that name. The single, undivided aim and intent of that body are so absolutely different from what has been advertised, that to-day its right name would be the "Druggists' League for the Maintenance of Walking Delegate and Haranguing Agitator Edward Thimme." It should still be called, as it is, a "Druggists' League," because a few deluded and deceived druggists of New York city have contributed and collected the necessary funds for fattening this cormorant, but these misguided fellows are beginning to find out that this mendacious individual has twisted the league to serve his personal ends, nothing more, nothing less. And finding this out, they are finding a little common sense at the same time, and withdrawing from membership in the league.

If anything more were needed to show the "Druggists' League" in its true colors, after the many disgusting, false and libelous pronouncements issued by Secretary and Business Agent Edward Thimme, it appeared last week in the following announcement by him:

"The Druggists' League has received charter 7,160 from the American Federation of Labor, and it is also now affiliated with the Workingmen's Federation of the State."

For the past nine or ten months Thimme has been scheming and scheming to turn the league into a labor union to maintain him as its walking delegate. The opposition which secured the veto of the league's bill last spring, saw this, and made it the strongest point of its fight. Now the members of the league themselves are beginning to see it, too; and they are getting out. That is what they should do. The Druggists' League for the Maintenance of Edward Thimme has no legitimate excuse for its existence. Thimme poses as the friend and benefactor of drug clerks. But in reality he is neither. He has done nothing for them except to vilify them. He is continually doing everything in his power to bring them into the worst repute with the public. And for these great benefactions, the men he slanders and abuses support him. It is time they awoke, and abandoned Thimme's league, and set him adrift to find a new job.

WHAT WAS ASKED AND WHAT GRANTED.

The National Association of Retail Druggists at its organization meeting at St. Louis last month, passed a resolution which they asked the Proprietary Association to adopt, worded as follows:

"That the price on proprietary goods to the retailer shall in no case exceed \$2 per dozen for 25-cent articles; \$4 per dozen for 50-cent articles; \$8 per dozen for \$1 articles, and all other articles in proportion, if purchased in lots of one dozen or more."

The proprietors voted down this resolution, after

long discussion, but the matter was again taken up in slightly different form at a subsequent session, and the following was adopted:

"At the request of the National Association of Retail Druggists, it is voted that this association recommend to proprietors that, wherever practicable, prices to the retailers should not exceed \$2 per dozen for 25-cent articles; \$4 per dozen for 50-cent articles, and \$8 per dozen for \$1 articles, and all other prices in proportion for lots of one dozen or more."

The rather radical difference between these two, what was asked and what was granted, is apparent. The second one is really, in effect, that the proprietors will adopt the proposed price schedule if they feel like it, if not, a loop-hole is provided in the phrase "wherever practicable." To be sure, the Proprietary Association, as an association, cannot bind its individual members to any particular action; it can only suggest and recommend. Still, the right kind of a suggestion or recommendation is often as effective as a command, and it is hoped the association's request that its members meet the wishes of the retailers will be very generally observed. It is a matter which cannot be adjusted all in a moment; it may occasion quite serious disturbance of business with some manufacturers, but the demand is a just one, and it is safe to say that those proprietors who do not grant it will very quickly and seriously feel the effects of the retailers' displeasure and the strong influence which will be exerted by his National Association.

The National Wholesale Druggists' Association asked of the proprietors the same thing, and in a circular which is being sent to all its members by the chairman of the Committee on Proprietary Goods, it is distinctly stated that "their (the retailers') position is a reasonable one, and better conditions in all branches of the trade will follow a compliance with their just demands. It goes without saying that the wholesaler can be depended upon to accede to the wishes of the retailers, when the proprietor does what is expected of him."

It remains to be seen if there will be the requested scaling down of prices by the manufacturers, to whom these resolutions and expressions of sentiment are directed.

LOOK OUT FOR BRANIGAN!

The drug trade is warned to have no dealings with James E. Branigan, No. 25 East Fourteenth street, New York City. He is trying to work the trade with the old, familiar mail-order swindle, trading upon the reputation of a reputable druggist of this name. It is believed this new fraud is none other than the old Fraser swindle under a different title. Elsewhere in this issue will be found a more extended account of the swindler's operations, but it is believed that he has not as yet caught many victims. Look out for him.

The Medical Age, of Detroit, and its publisher, Wm. M. Warren, have jointly been sued for \$25,000 damages by Wm. Smith, who alleges libel by the Medical Age. Wm. Smith is an osteopathist, and he feels badly because he has been called a "quack," and in particularly vigorous language by the Medical Age. Notwithstanding the fact that the followers of osteopathy have secured certain legal privileges to practice medicine in a few of our States, there is no doubt that Mr. Smith will have a hard time in collecting the \$25,000 he so ardently desires, for he will have to prove that he is not a quack, and that his methods are not unscientific and vicious, in face of the combined testimony of the reputable medical fraternity. We do not think the Medical Age will need much assistance in defending the suit, but if it does it will have no trouble in getting it, and in such proportion that Mr. Smith will very quickly not know "where he is at."

Correspondence.

We are pleased to publish here communications from our readers on topics of interest to the drug trade. Writers are requested to express their views as briefly as possible. Each article must be signed by its writer, but his name will not be published if so requested.

NO CALENDARS WANTED.

Madisonville, Ky., 2nd, 1898.

C. I. Hood & Co., Lowell, Mass.

Gentlemen:—Enclosed find your blank order sheet for Hood's Sarsaparilla. We have received them before this season, and with pleasure I filed my orders, but now we studiously avoid buying much Hood's Sarsaparilla, nor will we be distributors of Hood's Calendars for 1899.

When a firm gets so greedy, grasping and hellishly selfish as to take advantage of a small tax on the dozen to raise the price \$9 per gross on a sarsaparilla that is "put up" for possibly \$2 per dozen, or much less, then I for one expect to keep my shelves as near empty of Hood's Sarsaparilla as possible—only keeping enough to meet forced demand. Murphey's Sarsaparilla cures when Hood's fails—fact right here in Madisonville—and your little plan is the best advertisement Murphey's Sarsaparilla ever had.

For years it has been my rule when some one would call for a good blood medicine or "builder up" to say, "Hood's"—just would naturally somehow come right out—"but things have changed since Betsy died," and we don't hesitate to say Murphey's, or someone else's. Fact is, the people and druggists here made fools of themselves about Hood's Sarsaparilla, but now the thing is changed and you have turned fool, while the druggists and people are getting sensible. You may not believe this, but you will learn, even if it is too late. You will find that the friendship, or at least the kindly feeling, of the retail druggists of this country is worth something. We are evolving, and your action on the price of Hood's Sarsaparilla is a great cause for us to evolve and learn how to look out for ourselves, like you try to do by taking all the profit.

No, I don't want any calendars or sarsaparilla.

Yours to a finish,

C. H. MURPHEY.

Hibbing, Minn., Oct. 31st, 1898.

C. I. Hood & Co., Lowell, Mass.

Gentlemen:—Your calendar offer received, but as you are on our "Black List" (or as we call it in the store, "Hog List") we cannot accept it. We have already succeeded in almost stopping the sale of Hood's Sarsaparilla in our store, and cannot consequently advertise it.

Yours for mutual benefit,

SODERGREN & CO.,

Per Lignell.

Rushford, N. Y., Nov. 1, 1898.

To the Editor:—I refused Hood's Calendar offer, and have placed an order for calendars of my own. I did not know retail druggists made so much money, until Hood wrote what a large per cent. we made and what small per cent. he made, and that he must have more profit because it costs more or him to do business. Does the stamp tax cost the retail druggist anything?

Very truly yours,

E. C. GILBERT.

JOBBERS REFUSE TO HANDLE CALENDAR OFFER.

Indianapolis, Ind., Nov. 10, 1898.

To the Editor:—The situation of the Hood calendar offer matter in Indiana, as near as I can learn, is about as follows:

When the revenue stamp tax went into effect, Hood & Co. advanced their price to the retail trade to \$8.75 per dozen, with a discount of 5 per cent. when bought in lots of two dozen. The retail druggists of Indiana, in convention assembled, protested on the ground that the manufacturer should pay the war tax and not the retailer. The Indiana jobbers agreed with them. Hood's discount to jobbers was fixed at 10 per cent. margin. Jobbers of Indiana and the West generally refused and still continue to refuse to solicit for Hood's calendar

offer, on account of the small margin allowed them. About thirty days since, Hood & Co. made a special concession to jobbers of 75 cents on two dozen orders taken with calendar offers, and some unsolicited mail orders were accepted by wholesalers. Indianapolis jobbers, however, refused to be bought by this 75 cent concession, for the reason that they felt the retailers' claim should also have been recognized by Hood & Co. Indianapolis jobbers are standing by their customers in the struggle for fair margins for both wholesaler and retailer. The National Association of Retail Druggists organized in St. Louis in October passed strong resolutions asking manufacturers to fix their price on 81 preparations at a figure not higher than \$8 per dozen, and if all the retail druggists of the country stand together they can bring this matter about.

A. TIMBERLAKE,
Sec'y Ind. Ph. Assoc.

SOME CORRESPONDENCE.

New Brunswick, N. J., Nov. 7, 1898.

Mr. H. P. Hynson, President N. A. R. D., Baltimore, Md.:
Dear Sir—We have read with great interest the full report of St. Louis meeting and organization of the National Association of Retail Druggists, and are entirely in sympathy with the movement you have inaugurated.

We have had the pleasure of meeting personally quite a number of the delegates who were in attendance, and it was very gratifying to learn that the profit secured in the sale of our particular branch of pharmaceuticals was very satisfactory. However, as selling agents for Johnson's Digestive Tablets, we felt that there should be a change made in present prices of \$4.20 and \$9.40 per dozen to conform with resolution passed at your meeting, "that 50 cent and 81 articles should not cost the retailer in excess of \$4 and 8 per dozen," and have therefore decided to reduce the price of Johnson's Digestive Tablets to \$4 and \$8 respectively, bearing the burden of revenue stamps ourselves, and, in addition, reduce the price of the large size from \$9.40 to \$8 per dozen. These prices to take effect at once.

Appreciating that our interests are mutual, and with the assurance that we are indebted to the retail druggists for our marked success, we remain, yours very truly,

JOHNSON & JOHNSON.

Baltimore, Nov. 10, 1898.

Johnson & Johnson, New Brunswick, N. J.

Gentlemen—I have your courteous favor of the 7th inst., directed to me as President, N. A. R. D., and thank you very much for the good will expressed and encouragement given. I have referred your letter to the secretary of the association, Mr. T. V. Wooten, as it is quite desirable that the pharmacists throughout the country represented at St. Louis, should know the manufacturers who show a willingness to help us in our efforts to improve the condition of the retailers. I truly believe with you that our interests are mutual, and that a combination of the three branches of drug trade must result beneficially to all concerned. Awaiting your further pleasure, I am, yours very truly,

H. P. HYNSON.

A PREDICTION THAT HAS COME TRUE.

St. Paul, Minn., Nov. 7th, 1898.

To the Editor.—The following sentence is taken from a joint address of the Ramsey County Pharmaceutical Association and the Minneapolis Pharmaceutical Association to the manufacturers and proprietors of proprietary medicines of the United States, dated June 11th, 1890, a copy of which address was at that time mailed to every proprietary medicine manufacturer of any note in the United States:

It may be interesting now to some of you to sell large quantities of your goods to those sharks (the department stores and cutters) who sell them at retail for less than we can buy them in such quantities as we are likely to need them, but by-and-by it may not be so funny!—Isn't it funny?

Yours very truly,
J. P. ALLEN.

THE POSSIBILITIES OF COMBINATION.

How many times can the twenty-six letters of the English alphabet be written without repeating the exact sequence of the letters, or using the same combination twice? This was the question that arose one evening, early in October, in a discussion of a recent bank robbery, said to have occurred in a neighboring city, and in which the robber had, by wonderful expertise, or by chance, discovered the "combination" of the safe lock. A bank clerk, who had had considerable experience in figures, and knew something of their possibilities, suggested that probably the number might enter into the hundreds or even the thousands of millions—a suggestion that was laughed at as preposterous. The writer alone supported his dictum, and agreed to undertake the task of determining the exact number of possible combinations in which no letter should be used twice, and each of which should embrace the entire alphabet.

To get at this, no intricate calculation is needed. It is a simple question of multiplication on the following basis: With one letter there can be, of course, no change. With two letters, two arrangements are possible—a, b, ba, for instance. With three letters, the possible changes become 3 times 2, or six, thus, a, b, c, a, c, b, b, a, c, c, a, b, c, b, a. With four letters, the number of possible changes leaps up to 6 times 4, or 24; with five, to 5 times 24, or 120; with six, 6 times 120, or 720; with seven, to 7 times 720, or 5,040; with eight, to 8 times 5,040, or 40,320, and so on. Hence, to get at the actual number of possible changes in any number of letters, we commence with unity and multiply successively with every numeral up to and including the given number of figures. With twenty-six letters, then, the problem resolves itself to $1 \times 2 \times 3 \times 4 \times 5$, etc., up to 26. The result is represented by 403,291,461,126,605,635,584,000,000, or upwards of four hundred and three septillions and two hundred and ninety sextillions of times—figures so immense that the human intellect entirely fails to grasp them. Estimating the time necessary to write down each change and verify it (and this can easily be done by a certain system, which we need not explain), at one minute, it would take one person over eighty quintillions of years to write down the possible changes. The entire human race, including babes new-born, estimating the number at 1,400,000,000, could work continuously for nearly fifty-five hundred millions of years at the job before completing it.

A deck of euche cards (32 in number) can be shuffled or arranged so that no two arrangements shall be alike, 17,144,220 times more than the letters of the alphabet, or about eight decillions of times. These are numbers of which the human mind can form no adequate conception. In fact, it cannot begin to comprehend their significance. —National Druggist.

DECOCTIONS AND INFUSIONS.—Dr. Baur recommends as the most practical and uniformly complete exhaustion percolation of the powdered drug with hot water. The temperature varies with different drugs, depending on their properties. In preparing decoction of cinchona in the proportion of 10 parts of the bark to 200 parts of product, it was found that percolation, using an addition of 50 parts of boiling water, was more effective in exhausting the drug, without the use of acid, than digestion in a boiling waterbath, as proven by an examination of the residue. The product is therefore more uniform in strength and the preparation requires less time than by the other method. Condurango was completely exhausted by percolating 10 parts of the powdered bark with 150 parts of water of 50° C., shown by negative results in testing the last percolate for active principles. Ipecac and digitalis also gave most satisfactory results. Senega root is exhausted as readily with water of 60° C. as with 100°. As percolator may be used a flask of thin glass, the bottom of which has been removed. A layer of absorbent cotton is placed into the neck. (Südd. Ap. Ztg.)

ALCOHOL FROM THE GASES OF COAL DISTILLATION.—Fritsche (Chem. Ind.) calls attention to the gases formed in the distillation of coal as a possible source of alcohol. These gases contain 1 to 1.5 per cent. of ethylene, which may be readily removed. When ethylene is passed into sulphuric acid at 140° C., ethyl-sulphuric acid is formed, which, on boiling with water is decomposed into sulphuric acid and alcohol. (Südd. Ap. Ztg.)

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Ph.D.
Virgil Coblentz, A.M., Ph.D.
Wilbur G. Coughner, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heebner, Ph.M., Ph.G.
George B. Kaufman, B.Sc., Ph.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G., Ph.D.
Edward Kreners, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.

CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison.
Oscar Oldberg, Ph.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M., M.D.
Henry H. Rusby, M.D.
Samuel P. Sadtler, Ph.D.
L. E. Soyre, B.Sc., Ph.M.
Wilbur L. Seville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Störmer, Ph.G.
Frederick J. Wulling, Ph.G., Phm.D.

JUNIOR COURSE. LECTURE No. 17.

Inorganic Chemistry.

The Oxygen Group.—Concluded.

Halogen Compounds of Sulfur.—Of the halogen compounds of sulfur there are known three chlorids, all liquid; two iodids, both solid; and one bromid, also liquid. The existence of a gaseous fluorid has been reported, but has not been confirmed. The existence of a definite bromid may also be regarded as still open to question.

Chlorids of Sulfur.—The chlorids of sulfur are the monochlorid, S_2Cl_2 , the dichlorid, SCl_2 , and the tetrachlorid, SCl_4 .

The first is a yellowish-red, oily liquid and is of importance because of its being the best known solvent for sulfur. The others are unstable and unimportant.

Bromid and Iodids of Sulfur.—When sulfur is dissolved in bromin and the mixture is distilled, a deep, ruby red liquid is obtained, which has been supposed to be sulfur monobromid, S_2Br_2 . It is unstable, and its composition has been questioned. The two supposed iodids are the moniodid, S_2I_2 , and the hexaiodid, I_6S_6 . Sulfur moniodid, S_2I_2 , is official in the U. S. P. under the title *Sulfuris Iodidum*, and is prepared simply by fusing the two elements together. The existence of the hexaiodid is disputed.

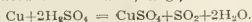
OXIDS AND OXYGEN ACIDS OF SULFUR.

Four oxids of sulfur are known, the sesquioxid, S_2O_3 ; the dioxid, SO_2 ; the trioxid, S_2O_3 , and the heptoxid, S_2O_7 .

Sulfur Sesquioxid, S_2O_3 . It is formed when dried sulfur in powder is dissolved in liquid sulfur trioxid. It is a blue-green solid, soluble in sulfuric acid to form a blue liquid, and is decomposed by water. It may be regarded as the anhydrid of hyposulfuric acid, $H_2S_2O_4$.

Sulfur Heptoxid, S_2O_7 . It is produced by the passage of the silent electric discharge through a mixture of the trioxid and oxygen. It is a white, crystalline solid, resembling the solid trioxid, fumes in the air and decomposes when dissolved in water. It is the theoretical anhydrid of persulfuric acid, $H_2S_2O_8$.

Sulfur Dioxid or Sulfurous Anhydrid, SO_2 . It occurs naturally in volcanic gases. It is formed whenever sulfur is burned in air, but is prepared for experimental purposes by the reducing action of certain metals, or of charcoal, on concentrated sulfuric acid, e. g.,

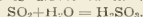


It is a colorless, heavy gas, possessing the suffocating odor of burning sulfur, and condensable by cold and pressure to a colorless, mobile liquid. Its importance depends upon the property which it possesses of decolorizing many organic substances, and also of destroying bacteria, and is therefore valuable as a bleaching agent and as an antiseptic and disinfectant. Like chlorine, it is effective for

these purposes only in the presence of water, but unlike the latter element its action is one of reduction instead of oxidation, the hydrogen which is set free acting as a reducing agent.

Sulfur Trioxid or Sulfuric Anhydrid, SO_3 . When pure, is a colorless, mobile liquid, congealing below $14.8^\circ C$. to a snow white solid or to colorless, prismatic crystals. By the absorption of traces of moisture it is converted into a fibrous modification which does not fuse below $50^\circ C$. It may be prepared by the direct oxidation of the dioxid or by the distillation of fuming sulfuric acid. Its most remarkable property is its affinity for moisture, which it attracts with so much avidity that it soon liquefies when exposed to the atmosphere. It is the anhydrid of sulfuric acid.

Sulfurous Acid, H_2SO_3 .—This acid is formed when sulfuric anhydrid is dissolved in water.



An aqueous solution containing not less than 6.4 per cent, by weight of sulfur dioxid constitutes the *Acidum Sulphurosum* of the U. S. P. The solution possesses the odor and bleaching properties of the gas.

On exposure to the air sulfurous acid gradually combines with oxygen to form sulfuric acid, so that its solutions always contain more or less of the latter compound.

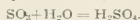
The salts of sulfurous acid, the sulfites, are an important class of compounds, useful both in the arts and in medicine, their chief value lying in their ability to release sulfur dioxid when treated with an acid. This reaction also serves to detect them in the process of analysis.

Sulfuric Acid, H_2SO_4 .—This is a colorless, heavy oily liquid, formerly called *oil of vitriol*, because first obtained by the distillation of green vitriol.

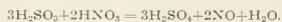


Fig. 30.—Manufacture of Sulfuric Acid.

The *Acidum Sulphuricum* of the Pharmacopœia contains 92.5 per cent. of the absolute acid, and has a specific gravity of 1.835. It can be prepared like sulfuric acid, by dissolving the corresponding anhydrid in water.



On the commercial scale it is manufactured by passing into large leaden chambers, sulfur dioxide, obtained from burning sulfur, steam, air, and nitric acid, or certain oxides of nitrogen. (Fig. 30.) Sulfur dioxide can not readily take up oxygen from the air, but can easily take it from the nitric acid or the nitrogen oxides which are present. The latter as fast as reduced take up fresh oxygen from the air, and thus act as carriers of oxygen to the sulfur. Theoretically this action of the nitric acid should continue indefinitely, but practically it does not, owing to its gradual dilution by the residual nitrogen of the air which is introduced. The completed reaction may be represented by the following equation, though it is quite certain that intermediate reactions occur.



The weak acid of the chambers is concentrated first in leaden and then in platinum vessels, and finally purified by distillation from platinum stills.

Sulfuric acid is probably the most important acid known. It is used in the preparation of many other acids, and in a large number of chemical and pharmaceutical operations. Enormous quantities of it are consumed yearly.

The concentrated acid has a great affinity for water, mixing with it with the evolution of considerable heat. For this reason the two should be mixed only in small quantities at a time, and by adding the acid to the water, never the reverse. If these precautions are neglected dangerous explosions are liable to occur from the suddenly generated steam. The concentrated acid chars a large number of organic substances by abstracting from them the elements of water.

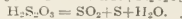
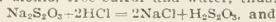
The salts of sulfuric acid, the sulfates, are an important class of compounds, and are used both in the arts and in medicine. Among the most important may be named ferrous sulfate, or green vitriol; cupric sulfate, or blue vitriol; alum, a double sulfate of aluminum and an alkali, etc.

Nearly all of the sulfates are soluble in water, those of barium, strontium and lead being exceptions. Calcium sulfate, or "plaster of paris," is sparingly soluble.

The most characteristic reaction of a soluble sulfate is the formation of a white precipitate with a barium salt, insoluble in acids.

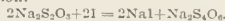
Thiosulfuric Acid. $\text{H}_2\text{S}_2\text{O}_3$.—This acid, formerly known as hyposulfurous acid, is very unstable, and is better known by its salts, the thiosulfates. Sodium thiosulfate is recognized by the U. S. P. under its old title, sodium hyposulfite. It is prepared by boiling together a solution of sodium sulfite with flowers of sulfur, and is much used in photography because of its power of dissolving silver salts, and in analysis as a reducing agent.

When a thiosulfate is treated with a mineral acid, thiosulfuric acid is first released, then quickly splits up into sulfur dioxide, free sulfur and water, thus:

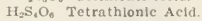
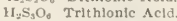
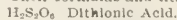


This reaction may be made use of as a test for the identification of a thiosulfate, the precipitate of sulfur serving to distinguish it from a sulfite, which also yields sulfur dioxide when treated with hydrochloric acid.

Another characteristic reaction of a thiosulfate is its power of decolorizing solutions of iodine, often taken advantage of in preparing the so-called "colorless tincture of iodine," which, however, consists of a mixture of sodium iodide and tetrathionate, produced according to the following equation:



The Thionic Acids.—Another series of oxygen acids of sulfur are known as the *thionic acids*, differing from each other in the amount of sulfur they contain. The special title of the series is derived from *thion*, the Greek name for sulfur. Their formulas and titles are as follows:

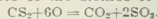


Carbon Disulfide, CS_2 .—This compound is formed by

passing the vapor of sulfur over red hot charcoal contained in iron or earthenware cylinders, and condensing the product.

It is a colorless, very mobile, volatile, and strongly refractive liquid. The commercial substance possesses a very disagreeable smell, due to the presence of other sulfur compounds, but when perfectly pure it has a sweetish, ethereal odor. It is practically insoluble in water, but mixes readily with absolute alcohol, chloroform, and ether. It is an excellent solvent for rubber, sulfur, and the fixed and volatile oils, and is much used for this purpose.

Its vapor is poisonous, and when mixed with air, explosive. It is easily inflammable, burning with a blue flame, and evolving vapors of the dioxides of carbon and sulfur.



SELENIUM (Selenium.)

Symbol Se. Valence 2, 4, 6. Atomic Weight 78.42.

Historical.—Selenium was discovered by the Swedish chemist Berzelius in 1817, in the red deposit which is found in sulfuric acid chambers when that acid is prepared from iron pyrites. The name, derived from the Greek *selena*, the moon, was bestowed upon the element because of its resemblance to tellurium, which takes its name from *tellus*, the earth. The form selenium is to be preferred to selenum, as the termination -um is properly restricted to metallic elements.

Natural Sources.—It is found in small quantities in some varieties of iron and copper pyrites, and also occurs as the selenides of silver, copper, lead and mercury.

Preparation.—The selenium of the market is usually obtained from the red deposit of sulfuric acid chambers above referred to, or from the fumes of furnaces in which pyrites are roasted, by a process intended to remove the lead and other substances present. It is never prepared by the student.

Physical Characters.—It is usually in the form of a brick-red powder, or in dark red translucent crystals. Like sulfur, several allotropic forms are known, differing in color, solubility in carbon disulfide, and crystalline form.

The several modifications have a specific gravity varying from 4.3 to 4.8. The form soluble in carbon disulfide has no definite melting point. The insoluble variety melts at 117°C . It boils at about 760° and yields dark red vapors. The same anomalies of vapor density are noticed as in the case of sulfur.

The most remarkable property of selenium is that exposure to light greatly increases its conducting power for electricity, especially in the case of the crystalline forms.

Chemical Properties.—Heated in the air, selenium burns with a bright blue flame, yielding selenium dioxide, SeO_2 , and an odor like that of rotten horse-radish. It is oxidized and dissolved by sulfuric and nitric acids, but is unaffected by hydrochloric acid. It is soluble in solutions of the alkalis, alkaline sulfides, and cyanids. With most of the other elements it unites when fused with them, to form selenides.

Uses.—Besides its use in the preparation of its compounds, elemental selenium finds some application in the manufacture of electrical apparatus in which advantage is taken of the variation of its electrical conductivity by the action of light.

COMPOUNDS OF SELENIUM.

Hydrogen Selenide, H_2Se .—This compound is the analogue of hydrogen sulfide, and may be prepared by heating together hydrogen and selenium vapor, or by the action of dilute hydrochloric acid on ferrous selenide, FeSe . It is a colorless, inflammable gas, with an odor resembling, but more offensive than that of hydrogen sulfide. It is very poisonous and is especially irritating to the mucous membrane of the mouth, eyes, and nose. It is soluble in water, and precipitates many of the heavy metals as selenides.

Halogen Compounds.—With chlorine, bromine and fluorine, selenium forms compounds similar in properties to the corresponding compounds of these elements with sulfur. They are, however, generally more stable than their sulfur analogues. The existence of the fluorid has not yet been certainly established.

Selenium and Oxygen.—One oxid of selenium, the

dioxid, and two oxygen acids, Selenous and Selenic, are known.

Selenion Dioxid. SeO_2 .—Prepared by heating the element in a current of oxygen. At ordinary temperatures it occurs in white shining needle-shaped crystals. At about 300° the crystals are converted to a greenish-yellow vapor. It is the anhydrid of selenous acid, which it forms when dissolved in water. Selenous acid forms colorless, transparent, prismatic crystals.

Selenic Acid. H_2SeO_4 . is produced by oxidizing a solution of selenous acid, or by decomposing a selenate with hydrogen sulfid. The absolute acid is in the form of colorless, hexagonal crystals. A concentrated solution of the acid is said to have the property of dissolving gold. The selenates generally bear a close resemblance to the corresponding sulfates.

Characteristic Reactions.—The compounds of this element are identified by the red precipitate of selenion which they yield when treated with sulfurous acid, and other reducing agents.

PRACTICAL STUDIES.

(1) By means of a pine splinter hold a small portion of sulfur in a flame until it ignites. Judging from the odor evolved, what compound is produced? Hold a moistened slip of litmus paper in the fumes. What is the result? Represent the burning by an equation.

(2) In a test tube place some copper foil or filings, cover with concentrated sulfuric acid and heat. When sulfur dioxid begins to be given off hold in the tube a slip of colored calico, first dry and then after moistening.

Why is the color changed in the second instance and not in the first?

(3) Make a solution of sulfurous acid by acidulating a moderately strong solution of sodium sulfite with hydrochloric acid. (Sodium chlorid will also be formed, but does not affect the reactions.) Add to the liquid a few drops of a moderately dilute solution of potassium permanganate. What takes place?

(4) Add a few drops of sulfuric acid to about ten times its volume of water, and to this add a small portion of a solution of barium chlorid. What takes place? What is the white precipitate produced? Write the equation.

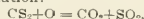
(5) Immerse a splinter of wood or a slip of paper in strong sulfuric acid. What occurs? Assuming the wood or paper to have the composition $\text{C}_6\text{H}_{10}\text{O}_5$, how would you explain the reaction?

(6) Make a solution of sodium thiosulfate. Acidulate by adding several drops of hydrochloric or sulfuric acid. Observe the mixture closely. Does it change in odor or appearance? Explain by equations.

Add a fresh portion of the thiosulfate solution to some tincture or solution of iodine. What occurs? Is the colorless solution "tincture of iodine?"

(7) Examine the odor and appearance of some carbon disulfid. Place one or two Cc. in a test tube, add about 10 Cc. of water and heat, using a test tube holder. When the liquid begins to boil bring the mouth of the tube to the flame. Note the odor of the flame. Hold a moist piece of blue litmus paper in the flame.

Balance the equation:



JUNIOR COURSE. LECTURE NO. 18.

Pharmaceutical Physics.

General Principles of Heat.

Ancient and Modern Theories.—Anciently heat was thought to be a kind of matter which was present in hot bodies and which left them on cooling. Later, when it was observed that bodies neither gained weight in becoming heated nor lost weight in cooling, it was concluded that heat could not be a kind of matter, since all known kinds of matter possess weight. Still later, heat was thought to be a special kind of force or energy, but with the discovery and enunciation of the general law that all forms of energy are mutually convertible one into another, this theory had also to be abandoned. It is now almost universally believed that the temperature of any portion of matter depends upon the motion of its molecules, the more rapid their motion the higher the temperature, and conversely, or in other words, that heat is the energy of molecular motion. This is commonly spoken of as the mechanical theory of heat.

The molecular motion here referred to is not necessarily a translatory motion in which the molecule flies back and forth within a given space, but is more likely

a vibration of the parts of the molecule itself. How this may be can be understood by a reference to the conception of the atom as an elastic ether ring. Such a ring, if struck or pulled on one side, will shorten in one diameter and elongate in another, forming an ellipse, and, owing to its elasticity, will on the rebound, form a second ellipse trans-

verse to the first. (Fig. 51). Such vibration once set up must continue until the ring is able to dispose of its surplus energy by collisions with its neighbors. This conception of the atom also enables us to understand why a body, as a bullet, should be heated by impact, as it is evident that the shock must throw all the molecules into violent vibrations.

Origin of Heat.—Heat always originates from an expenditure of energy of some other kind. The several means of generating heat are by friction, by impact, as by the hammering of a piece of metal, by electricity, as

the electric arc, or by chemical means, as in the combustion of fuel, and are all examples of the expenditure of energy.

In these and in all other cases of heat generation, some other form of energy must be expended, the amount of energy used up in each case being proportional to the amount of heat produced.

The Constitution of Matter.—The mechanical theory of heat is closely connected with the modern theory of the constitution of matter, and may be said to be a part of it. As stated in a preceding lecture, the modern conception of matter is that it is made up of inconceivably small particles, which are not in contact, even in the most solid appearing bodies, but are separated by spaces which are large as compared with the diameters of the particles themselves, and, further, that these particles are not at rest, but in a state of exceedingly rapid motion, which increases and decreases with the rise and fall of temperature.

Distinction Between Quantity of Heat and Temperature.—Quantity of Heat and Intensity of Heat are quite different things, and require different units and methods of measurement. It is evident that more heat is present in a large body than in a smaller body of the same material when both have the same temperature. For instance, a cup of boiling water will be just as hot, i. e., have the same temperature, as the vat from which it is taken, but the total quantity of heat in the vat is as many times greater than that in the cup as its quantity of water is greater. It is plain, therefore, that by Temperature is meant the intensity of heat possessed by a body and not its quantity. The measurement of temperature is known as Thermometry, and the measurement of the quantity of heat as Calorimetry.

The Thermometer.—Temperature is most conveniently measured by the amount of expansion caused by heat in the length of a column of a standard substance. The instrument used is called a Thermometer, and may be constructed of any material or of any form which will enable the expansion to be measured on a regular scale of degrees.

Form and Material of Thermometers.—The most

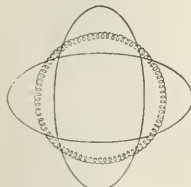


Fig. 51.—Vibrating Vortex Ring verse to the first. (Fig. 51). Such vibration once set up must continue until the ring is able to dispose of its surplus energy by collisions with its neighbors. This conception of the atom also enables us to understand why a body, as a bullet, should be heated by impact, as it is evident that the shock must throw all the molecules into violent vibrations.

common form is that of a long, narrow tube of glass, of very regular bore, containing an expansive liquid, generally mercury, and having a card attached, upon which is marked a scale, or having a scale engraved on the stem. The latter is the form best adapted to the purposes of the pharmacist, and is known as the Chemical Thermometer. (Fig. 52). For thermometers intended to measure ordinary and moderately high temperatures, mercury is used, which freezes at -38.8°C . and boils at 350°C . Alcohol is best adapted to the measurement of very low temperatures, as it is not possible to freeze it by ordinary methods, but is not suitable for high temperatures, as it boils at 78°C . The alcohol is usually colored, in order that the motion of the thread of liquid may be more conspicuous.

Other Forms of Thermometers.—To measure the temperature of living rooms, a convenient form is one in which the expansion or contraction of a coiled strip of metal moves a pointer over a dial. (Fig. 53). With these the changes of temperature can be observed some distance away from the instrument. For the measurement of very high temperatures, as of blast furnaces, special methods and instruments are used which are of but little interest to the pharmacist.

The Graduation of Thermometers.—For the graduation of thermometers two fixed points of temperature are necessary. The freezing and boiling points of water are the ones selected. Since these vary with the pressure of the atmosphere, the experiments must be conducted at normal pressure, or such correction must be made as will produce the same results. The thermometer is first placed in a mixture of snow and ice and a mark made at the lowest point to which the mercury falls. (Fig. 54). The thermometer is next suspended in a vessel of boiling water in such a way that the entire instrument is immersed in the ascending steam, and a second mark made at the highest point to which the mercury rises. (Fig. 55).

If the instrument is to be a Centigrade, (which means one hundred steps), the distance between the two fixed points is divided into one hundred equal divisions or degrees, and the freezing point is marked zero. The Centigrade thermometer is almost universally used in scientific work, and is the one always referred to in these lectures, unless the contrary is expressly stated.

Another instrument sometimes met with is Reaumur's. In this thermometer the distance between the freezing and boiling points is divided into 80 degrees. It is rarely used in the United States.

A common method of graduation, especially of the cheap instruments which are intended for popular use, is seen in the Fahrenheit thermometer, so named from its inventor. In this instrument the freezing point of water is marked 32° , and the graduations carried 32 degrees down the stem to the point which is selected as zero. The distance between the freezing and boiling points is divided into 180 degrees, which brings the boiling point to 212° above the point marked zero. The Fahrenheit instrument has nothing to recommend it except long established usage. (Fig. 56).

On all thermometers, temperatures below zero are distinguished by the minus sign, as -6° .

Owing to the common use of the Fahrenheit thermometer, temperatures are still frequently expressed in degrees of that scale. For this reason, it is frequently necessary to convert $^{\circ}\text{F}$. degrees and temperatures into $^{\circ}\text{C}$. degrees and temperatures and *vice versa*.

Since 100 degrees $^{\circ}\text{C}$. equal 180 degrees $^{\circ}\text{F}$., one degree $^{\circ}\text{C}$. is equal to 1.8 degrees $^{\circ}\text{F}$.

Therefore, to convert a given number of Centigrade degrees to Fahrenheit, multiply the number of $^{\circ}\text{C}$. degrees by 1.8. To convert a given number of $^{\circ}\text{F}$. degrees to $^{\circ}\text{C}$., divide the number of $^{\circ}\text{F}$. degrees by 1.8.

For example, $10^{\circ}\text{C} \times 1.8 = 18^{\circ}\text{F}$. and $32^{\circ}\text{F} \div 1.8 = 20^{\circ}\text{C}$.

To find the equivalent reading of a Centigrade on a Fahrenheit thermometer, after conversion of the $^{\circ}\text{C}$. degrees to $^{\circ}\text{F}$. degrees, add 32° , since the latter instrument is marked 32 at the point where the Centigrade is marked zero. To convert a reading of the Fahrenheit scale to an equivalent reading on the Centigrade scale, first subtract the 32° found on the $^{\circ}\text{F}$., but not on the Centigrade, and convert the remaining $^{\circ}\text{F}$. degrees to $^{\circ}\text{C}$. degrees by the rule given above.

For example, if the temperature of the air is 10°C . Centigrade, what will be the Fahrenheit? $10^{\circ}\text{C} \times 1.8 = 18^{\circ}\text{F}$., and $18^{\circ}\text{F} + 32 = 50^{\circ}\text{F}$.

If the temperature be 60°F ., what will it be by the Centigrade thermometer? $60^{\circ}\text{F} - 32 = 28$, and $28 \div 1.8 = 15.5^{\circ}\text{C}$., the temperature on the Centigrade scale.

Absolute Zero and Absolute Temperature.

The obvious meaning of zero would be that at that point all heat would be absent. That this is not the common meaning of the term is readily seen from the fact that the temperature is frequently known to fall below the zero point of the thermometer. From certain well ascertained facts in the behavior of gases, and for certain other reasons, it has been assumed that all heat would be absent at or above 273°C . Centigrade below the freezing point of water, (-459°F .). This point has been called the *absolute zero*, and temperatures reckoned from it are known as *absolute temperatures*. Readings on the Centigrade scale may be converted to readings on the absolute scale by adding 273 to the given Centigrade temperature, e. g., 15°C . is equal to $15 + 273 = 288^{\circ}$ on the absolute scale. In the same way, adding 459 to a reading on the Fahrenheit scale gives the corresponding absolute reading in $^{\circ}\text{F}$. degrees. It would perhaps be more convenient for many purposes if thermometers were graduated upon the absolute scale rather than upon the arbitrary scales at present in use. (Fig. 57).

Calorimetry.—It is generally sufficient for the purposes of the pharmacist to be able to measure and regulate the temperature at which his processes are conducted, without regard to the total quantity of heat which may chance to be absorbed or given out in the operation, but for scientific purposes, the quantity of heat evolved or absorbed is frequently a matter of great importance.



Fig. 53.—Dial Thermometer. marked 32 at the point where the Centigrade is marked zero. To convert a reading of the Fahrenheit scale to an equivalent reading on the Centigrade scale, first subtract the 32° found on the $^{\circ}\text{F}$., but not on the Centigrade, and convert the remaining $^{\circ}\text{F}$. degrees to $^{\circ}\text{C}$. degrees by the rule given above.

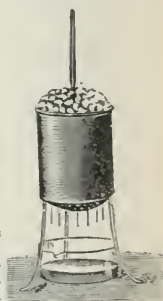


Fig. 54.—Fixing the Freezing Point.

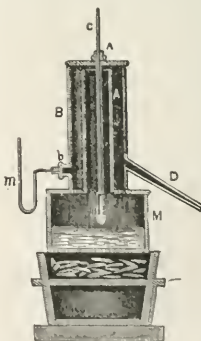


Fig. 55.—Fixing the Boiling Point.

Fig. 52.—Chemical Thermometer.

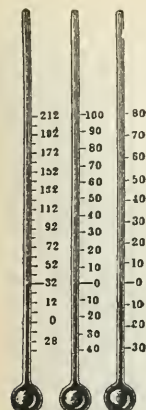


Fig. 56.—Fahrenheit, Centigrade and Reaumur Thermometers, also a familiar fact that heat is the starting point for the production of mechanical energy, as in the steam engine, and that by means of the latter, electrical energy is generated for use in the electric light, electric motor, etc.

By Dr. Joule, of England, it was determined that the calorie is the equivalent of 424 kilogrammeters, or that this amount of heat if completely converted into mechanical work is sufficient to raise a weight of 1 KGm. to a height of 424 M., or conversely that a weight of 1 KGm. in falling 424 M. would generate an amount of heat equal to the Calorie. One calorie is therefore the equivalent of 424 kilogrammeters of mechanical work.

The Calorimeter.—The instrument by means of which quantities of heat are measured is known as a Calorimeter. Numerous forms of the instrument have been used and proposed, but one of the most useful depends upon the quantity of ice at 0° C. which can be melted into water at the same temperature. A simple form of this apparatus consists of a thin vessel of copper, or platinum, surrounded by crushed ice, and shielded by an outer vessel also filled with ice to absorb any heat which might come from the surrounding atmosphere. (Fig. 55). The substance whose heat is to be measured

	C.	F.	Abs. Temp. Centigrade.	Abs. Temp. Fahrenheit.
Tin melts	232°	450°	506°	923°
Water boils	100°	212°	373°	632°
Alcohol boils	78°	172°	351°	599°
Ether boils	35°	95°	308°	522°
Ice melts	0°	32°	273°	459°
Mercury freezes	-38.8°	-37.9°	234.2°	421.5°
Alcohol freezes	-130.3°	-202.9°	112.5°	256.5°
Lowest temperature yet attained estimated to be about	-273°	-459.4°	0°	0°

is placed in the inner vessel and permitted to cool down to 0°, while the water which flows from the ice melted thereby is collected and weighed. From this the heat possessed by the hot body can be calculated, since it can be shown that the amount of heat which is given out by a body in cooling from a given temperature is exactly equal to the amount which would be required to restore it to its original temperature.

Diffusion of Heat.—That a body heated to a tem-

perature above that of the surrounding atmosphere will not remain at that point, but will continue to lose heat until reduced to the temperature of surrounding objects, is one of the most familiar of facts. It has been established that a body may part with its heat in three different ways, by *Conduction*, by *Convection* and by *Radiation*.

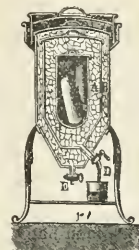


Fig. 58.—Calorimeter. Conductors than liquids and liquids better than gases. A dense close texture favors, and a loose, fibrous texture, retards conduction. Wood is a poor conductor, for which reason the handles of utensils which are to be heated are frequently made of wood. Animal fibers conduct heat slowly, and make warm clothing, as they do not permit the heat of the body to escape rapidly. The same principle is made use of in the Norwegian Cooking Box, which is a chest lined with a thick layer of felt, and which so retains the heat that substances to be cooked need merely to be placed in boiling water and the vessel enclosed in the box, the cooking being finished by the heat already present.

Convection is the diffusion of heat by circulation or by the movement of heated principles from one place to another. A familiar example is the heating of a room by a stove. The air in immediate contact with the stove is warmed, and becoming lighter than the surrounding portions, rises to the ceiling and flows off at the sides, thus imparting its warmth to the various objects in the room.

Convection currents in a liquid may be made visible by placing some insoluble powder, as bran, in a vessel of cold water and exposing the vessel to a source of heat. The motion of the solid particles will show the rise of heated currents in the center, which flow off at the top to the sides and down again until all of the water is raised to the same temperature.

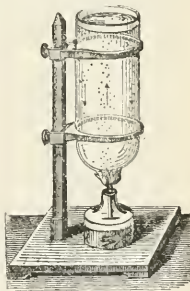


Fig. 59.—Illustrating Convection Currents.

Radiation is the transmission of heat by vibration without raising the temperature of the space through which it travels, as in the passage of the sun's heat to the earth. During the act of radiation the heat does not exist as such, but as the energy of ether vibration, and is reconverted into heat only when its free passage through space is checked by coming in contact with some material object. By the beating upon them of the ether waves, the material molecules are set in vibration, and the radiant energy assumes a form in which it is capable of affecting the thermometer.

Radiation, or the transmission of energy by ether waves, will receive further consideration in connection with the subject of Light.

PRACTICAL STUDIES.

Place a thermometer in contact with various objects in a room, as wood, metal, glass, cloth, etc. All show practically the same temperature. Now place the hand in contact with the same objects. Do they seem equally warm? Why? Which are the better conductors of heat?

Place a vessel containing cold water over a source of heat, add some small bits of paper, and study the convection currents formed.

SENIOR COURSE. LECTURE No. 17.

Group II. Alcoholic Preparations.

Including All Official Liquid Preparations, the
Principal Menstruum or Solvent of
Which Is Alcoholic in Character.

ETHYL ALCOHOL.

Ethyl Alcohol, or Grain Alcohol, as it is more commonly called, is one of the most valuable solvents known to pharmacy. Besides its wide range of solvent powers, it is, when of sufficient strength, one of the most efficient of preservatives, and the alcoholic galenicals are consequently quite permanent preparations. Its solvent powers are such that while it generally dissolves the potent and medicinally valuable principles of organic drugs, it does not dissolve gums, starches, and many other inert substances. It dissolves nearly all resins and volatile oils, some fixed oils, the alkaloids and their salts, and many inorganic compounds.

Alcohol is official in four forms, differing in the percentage of absolute alcohol or ethyl hydroxid, C_2H_5OH , which they contain.

Alcohol. Alcohol, 91 per cent. by weight, or 94 by volume.

Alcohol Absolutum. Absolute Alcohol, 99 per cent. by weight.

Alcohol Deodoratum. Deodorized Alcohol, 92.5 per cent. by weight, or 95.1 by volume.

Alcohol Dilutum. Diluted Alcohol, 41 per cent. by weight, or 48.6 by volume.

The official liquid galenicals made with alcohol as the principal solvent or menstruum are the Spirits, Elixirs, Tinctures, Wines, and Fluid Extracts.

SPIRITS.—The Spirits.

The spirits are solutions of volatile substances in alcohol, and are prepared by simple admixture or solution, or by distillation. Owing to the volatile nature of their dissolved substances the spirits bear the same relation to the Waters that the Tinctures bear to the Liquors. The spirits containing only volatile oils are popularly known as *essences*.

When prepared by distillation from vegetable drugs the source of heat is preferably a steam- or water-bath, otherwise the spirits may acquire an empyreumatic flavor from the action of heat on the drug. When prepared by dissolving volatile oils in alcohol, precaution should be taken to use only fresh and fragrant oils, and to reject any which may have become resinified or terbinthinate from age.

There are twenty-five official spirits, three of which, Whiskey, Brandy, and Spirit of Nitroglycerin, are never prepared by the pharmacist, and consequently have no formulas given for them in the Pharmacopœia.

According to the nature of their dissolved substances, the official spirits may be divided into four sub groups, as follows:

1. Containing Products of Fermentation.
2. Containing Volatile Oils or a Stearopten.
3. Containing Artificial or Synthetic Organic Compounds.
4. Containing Inorganic Substances.

SUB GROUP I. CONTAINING PRODUCTS OF FERMENTATION.

The two members of this sub group are never prepared by the pharmacist, and belong therefore more properly to the class of pharmaceutical materials, where they will be more particularly described.

Spiritus Frumenti. Whiskey.—Alcohol, 44 to 50 per cent. by weight, 50 to 58 per cent. by volume.

Spiritus Vini Gallici. Brandy.—Alcohol, 39 to 47 per cent. by weight, 46 to 55 per cent. by volume.

Whiskey is prepared by distilling the mash of fermented grain, and should be at least two years old. Brandy is the liquid resulting from the distillation of the fermented juice of grapes, and should be at least four years old.

Both preparations are to be looked upon as forms of alcohol, plus ethers and flavoring matters produced by

fermentation and distilled over, together with coloring matter and tannin extracted from the barrels in which they are commonly contained.

SUB GROUP II. CONTAINING VOLATILE OILS OR A STEAROPTEN.

These are fifteen in number, and consist of simple or compound solutions of volatile oils, or of a stearopten, in alcohol. When the oils are of delicate odor or flavor, deodorized alcohol is employed as the solvent.

Simple Solutions of Volatile Oils.

These are eight in number and are most conveniently grouped according to their percentage strengths.

One Per Cent.

Spiritus Amygdalæ Amaræ. Spirit of Bitter Almond, (Essence of Bitter Almond).—Dissolve 10 Cc. Oil of Bitter Almond in 990 Cc. Alcohol, and add Distilled Water to make 1000 Cc.

Five Per Cent.

Spiritus Aurantii.—Spirit of Orange.

Spiritus Gaultheriæ.—Spirit of Gaultheria.

Spiritus Juniperi.—Spirit of Juniper.

Spiritus Lavandulæ.—Spirit of Lavender.

Spiritus Myristicæ.—Spirit of Nutmeg.

In each case 50 Cc. of the oil is dissolved in 950 Cc. of Alcohol. Deodorized Alcohol is directed for the spirits of Orange and of Lavender.

Ten Per Cent.

Spiritus Anisi.—Spirit of Anise.

Spiritus Cinnamomi.—Spirit of Cinnamon.

Dissolve 100 Cc. of Oil in 900 Cc. Alcohol. Deodorized Alcohol is directed to be used for Spirit of Anise.

Simple Solutions of Volatile Oils with Coloring Substances.

Three of the official spirits are macerated with a portion of the fresh or dried drug to impart a pleasing color.

Five Per Cent.

Spiritus Limonis. Spirit of Lemon.—Dissolve 50 Cc. Oil of Lemon in 950 Cc. Deodorized Alcohol and macerate with 50 Gm. freshly grated Lemon Peel for 24 hours. Filter, and add Deodorized Alcohol through the filter to make 1000 Cc.

Used principally as a flavoring extract.

Ten Per Cent.

Spiritus Menthe Piperitæ.—Spirit of Peppermint.

Spiritus Menthe Viridis.—Spirit of Spearmint.

Dissolve 100 Cc. of Oil in 900 Cc. Alcohol, add 10 Gm. of Herb (Spearmint or Peppermint) and macerate for 24 hours. Filter, and add alcohol through the filter to make 100 Cc.

Simple Solution of a Stearopten.

Spiritus Camphoræ. Spirit of Camphor.—Dissolve 100 Gm. Camphor in 800 Cc. Alcohol; filter, and add Alcohol through the filter to make 1000 Cc.

Compound Solutions of Volatile Oils.

These are three in number, and are made in the same manner as the simple spirits, by dissolving the required amounts of the several oils in alcohol.

Spiritus Aurantii Compositus. Compound Spirit of Orange.—Dissolve 200 Cc. Oil of Orange Peel, 60 Cc. Oil of Lemon, 20 Cc. Oil of Coriander, and 5 Cc. Oil of Anise in sufficient Deodorized Alcohol to make 100 Cc. Keep in completely filled, well stoppered bottles, in a cool, dark place. Used for making Aromatic Elixir.

Spiritus Juniperi Compositus. Compound Spirit of Juniper.—Dissolve 8 Cc. Oil of Juniper and 1 Cc. each of the Oils of Caraway and Fennel in 1400 Cc. Alcohol, and add gradually sufficient water to make 2000 Cc.

Spiritus Myrcis. Spirit of Myrcia, (Bay Rum).—Dissolve 16 Cc. Oil of Myrcia and 1 Cc. each of the Oils of Orange Peel and Pimenta in 1200 Cc. Alcohol, add gradually sufficient water to make 2000 Cc., and set aside for eight days. Filter through paper in a well covered funnel.

SUB GROUP III, SOLUTIONS OF ARTIFICIAL OR SYNTHETIC ORGANIC SUBSTANCES.

Five official spirits are simple or compound solutions of artificially prepared Organic Substances. Two of these substances are Ethers, or the oxids of hydrocarbon residues, and three are of the nature of Compound Ethers or Ethereal Salts.

Spiritus Aetheris. Spirit of Ether.—Mix 325 Cc. Ether with 675 Cc. Alcohol.

Practically this is a diluted form of Ether and has the same properties, but weaker. The dose is from 4 to 12 Cc., as a stimulant and antispasmodic.

Spiritus Aetheris Compositus. Compound Spirit of Ether, (Hoffman's Anodyne).—Mix 325 Cc. Ether and 25 Cc. Ethereal Oil with 650 Cc. Alcohol. Possesses the anodyne properties of the ethereal oil in addition to the properties of the ether. Dose 2 to 5 Cc., in sweetened water.

Spiritus Glonoini. Spirit of Glonoin. (Spirit of Nitroglycerin).—This spirit consists of 1 per cent. Glycerin Trinitrate, or Nitroglycerin, $C_3H_5(NO_3)_3$, dissolved in Alcohol. The preparation should be kept and stored in tin cans, remote from lights and fire. If spilled, and the alcohol be permitted to evaporate, the dangerously explosive nitro-glycerine is left behind.

It is used as a powerful cardiac stimulant in collapse, asphyxiation from coal gas, etc., and is usually administered hypodermically. Dose 1 to 2 minims.

Spiritus Aetheris Nitrosi. Spirit of Nitrous Ether.—Ethyl Nitrite is first prepared by dissolving 770 Gm. Sodium Nitrite in 100 Cc. Water, adding 550 Cc. Alcohol and 520 Gm. Sulfuric Acid, previously diluted with 1000 Cc. Water, and connecting the containing flask with a well cooled receiver. A gentle heat is applied to the flask until no more nitrous ether distills over.

The distillate is washed with 100Cc. ice cold water, to remove alcohol, and then with a solution of 10 Gm. Sodium Carbonate in 100 Cc. ice cold water, to neutralize free acid. The ether is separated from the wash water, and agitated with 30 Gm. Dried Potassium Carbonate to remove traces of water. Finally the washed and dried nitrous ether or ethyl nitrite, $C_2H_5NO_2$, is filtered through a pledget of cotton into 2000 Cc. Deodorized Alcohol contained in a tared bottle, and sufficient Deodorized Alcohol added to make the finished product weigh 22 times the amount of the Nitrous Ether added.

The spirit should be kept in small, dark amber-colored, well stopped bottles, in a cool place, remote from lights and fire.

When the freshly prepared spirit is assayed by the official process it should yield not less than 11 times its volume of nitric acid gas, corresponding to about 4 per cent. ethyl nitrite. It is an instable preparation, the ethyl nitrite gradually decomposing into nitric acid and water.

It is diuretic, diaphoretic, and antispasmodic. Dose, 2 to 4 Cc.

Spiritus Chloroformi. Spirit of Chloroform.—Dissolve 60 Cc. Chloroform in 940 Cc. Alcohol.

SUB GROUP IV, SPIRITS CONTAINING INORGANIC SUBSTANCES.

These are three in number. One is a simple solution of a solid elementary substance, one a simple solution of an inorganic gaseous compound, and one a compound solution of a gas combined with an inorganic salt and volatile oils.

Solution of a Solid Element.

Spiritus Phosphori. Spirit of Phosphorus, (Tincture of Phosphorus).—Weigh 1.2 Gm. Phosphorus in a tared dish under water, dry quickly, and place in 1000 Cc. Absolute Alcohol contained in a suitable flask which is connected with an upright, well cooled condenser. Heat to gentle boiling on a water bath until the Phosphorus is dissolved. If necessary, bring to 1000 Cc. by addition of Absolute Alcohol. Preserve in small, dark amber-colored, well stopped bottles, in a cool, dark place. Each Cc. contains 0.0012 Gm. Phosphorus.

Used in the preparation of the Elixir of Phosphorus.

Simple Solution of a Gaseous Compound.

Spiritus Ammoniae. Spirit of Ammonia.—Place 250 Cc. Stronger Water of Ammonia in a flask provided with a safety tube, and connected by means of a glass condenser with a well cooled receiver containing 500 Cc. Alcohol. Heat the flask carefully to 60° C. and maintain the temperature for ten minutes. Disconnect the flask,

assay the solution with Normal Sulfuric Acid, using Rosolic Acid as indicator, and dilute with Alcohol so as to make the finished product contain 10 per cent by weight of Ammonia, NH_3 . The Alcohol used should have been recently distilled, and preserved in glass vessels.

Keep in glass stoppered bottles, in a cool place.

Stimulant and antispasmodic. Dose, 0.6 to 2 Cc., in a wineglassful of water. Most frequently used as a stimulating addition to liniments, only rarely as a constituent of mixtures intended for internal use.

Compound Solution of Inorganic Substances.

Spiritus Ammoniae Aromaticus. Aromatic Spirit of Ammonia.—Reduce 34 Gm. Ammonium Carbonate in translucent pieces, to a moderately fine powder and dissolve in a mixture of 50 Cc. Ammonia Water and 140 Cc. Distilled Water, by agitation in a stoppered flask. Gradually pour this solution into 700 Cc. Alcohol in which 10 Cc. Oil of Lemon, and 1 Cc. each Oils of Lavender Flowers and Nutmeg have been dissolved, and add Distilled Water to make 1000 Cc. Allow to stand for 24 hours, and filter through paper in a well covered funnel. If the mixture contains a crystalline precipitate do not filter until this is redissolved.

Preserve in glass-stoppered bottles, in a cool place.

Stimulant, antacid and carminative. Dose, 2 to 4 Cc.

ELIXIRIA.—The Elixirs.

Elixirs are aromatic, sweetened, alcoholic solutions of medicinal substances. As the principal object sought in the preparation of the modern elixir is a pleasant taste and an agreeable appearance, the medicating ingredients are commonly present in such small proportions that unless the drug be a very potent agent the elixir will have but little value as a medicine beyond the stimulating effects of the alcohol.

Notwithstanding their feeble activity, a large number of elixirs are in common use, though their popularity at the present time is on the wane. Many of them are used mainly as pleasant vehicles for disagreeable medicines. Since many of the volatile oils used in the manufacture of elixirs are only moderately soluble in dilute alcohol, it is common to make use of trituration with or filtration through an absorbent powder to promote solution.

Two elixirs are official, one intended as a pleasant vehicle, and the other containing a potent physiological agent. Both are made by simple solution or admixture. In the first, precipitated phosphate of calcium is used to aid solution of the volatile oils.

Elixir Aromaticum. Aromatic Elixir.—Twelve Cc. Compound Spirit of Orange is diluted with Deodorized Alcohol to make 250 Cc., and to this solution 375 Cc. Syrup is added, gradually, with agitation, and then 375 Cc. Distilled Water added in the same manner. The liquid is then intimately mixed by shaking with 15 Gm. Precipitated Calcium Phosphate and filtered through a wetted filter, the filtrate being returned until it runs clear. The filter is then washed with a mixture of one volume of Deodorized Alcohol and 3 volumes of Water to make 1000 Cc. Used as a vehicle.

Elixir Phosphori. Elixir of Phosphorus.—To 210 Cc. Spirit of Phosphorus contained in a graduated bottle, add 2 Cc. Oil of Anise and 550 Cc. Glycerin, and mix by repeatedly inverting the bottle until a clear liquid is formed. Add gradually, with gentle agitation, sufficient Aromatic Elixir to make 1000 Cc.

Keep in dark, amber-colored, well stopped bottles, in a cool, dark place.

Each Cc. contains one-fourth milligram of phosphorus. Dose, 1 to 3 Cc.

COMPOUNDS OF CASEIN WITH HEAVY METALS.

—For preparing a compound of mercury and casein 10 parts of free casein are suspended in strong alcohol, a concentrated aqueous solution of 2 parts of mercuric chloride is added, and the mixture heated several hours on a water-bath with frequent stirring, under a reflux condenser. After cooling, the alcohol is removed by filtration and the residue washed with warm water until no uncombined mercuric chloride can be detected in the washings. It is then dried at a moderate temperature. Compounds with other metals may be made in a similar manner. (Sudd. Ap. Ztg.)

SENIOR COURSE, LECTURE No. 18.

Drug Store Advertising.

BY WM. M. FREDENBURG.

INTRODUCTORY.

The great variety and extent which have of late years distinguished advertising as a feature in the conduct of business have quite naturally created the idea that it is a subject suitable for didactic treatment. This idea is manifestly reasonable, but it suggests many practical difficulties. Considered as a science or art, advertising is apparently lacking in well-defined principles, definitions and rules. The subject is comparatively new so far as comprehensive study is concerned and its literature, while voluminous, is of a fugitive character, and ideas concerning it are constantly changing.

But in spite of this obvious condition of affairs, the vast amounts of money spent in advertising and the generous proportion of space which it occupies in public prints in comparison with what is called "reading matter," almost voice a demand that an attempt be made to put the matter in tangible shape by the formulation of definitions and rules, and the application of that philosophy which endeavors to discover the why and wherefore of all things.

Assuming that in time advertising will be recognized as either an art or science, possibly as a department of psychology in which the attraction of attention and grace of address will be the important features, the first things to be considered are definitions and general rules. After these are once mastered the situation will be much the same as in other lines of work. The personal equation and wise application of general principles will determine success.

The most commonly accepted definition of advertising, and the one which is most specific, is that of giving public notice through the press. In this limited sense it is perhaps best understood, but a survey of all the modern methods of publicity gives sanction to an acceptance of the wider and original meaning, applied particularly to merchandise for sale, viz: that of informing or making known. There is but little essential difference between these definitions, but there is a distinction which may be comforting to the novice. To him public notice through the press is a more or less formidable affair, involving some literary skill which is only acquired through study and practice, to say nothing of the hardihood to resist that peculiar irritation known as literary criticism.

On the other hand, informing or making things known to others are such common incidents of every day life that they seem to be natural acquisitions. The beginner who can entertain this second view is fortunate. He can approach his task with comparative ease of mind and his efforts will show a simplicity of style which will appeal to the dullest comprehension, and at the same time win the approbation of the literary critic.

There are other definitions of a yet more specific character. One of these includes within its meaning all agencies used to attract attention to a business, such as one's personal qualities and demeanor, social standing, printed advertisements, etc. Another characterizes advertising as simply telling, through printed communications, those people who wish to buy goods about the goods which one has to sell.

The foregoing general observations are offered with the purpose of fixing in the mind of the student these two facts, viz: that advertising is one of the most important things which are included in business methods, and, as its definitions suggest, it is, or can be made, a matter of extreme simplicity. Its relation to business may be illustrated by considering it as one of the angles of the business triangle, the other two angles being buying and selling. Another and perhaps more striking illustration of this relation may be furnished by considering the drug business as it is now carried on. There must first be a study of the material to be made or dealt in, and the proper manipulation of the tools of trade. The schools of pharmacy furnish this opportunity for the pharmacist. There must then be a study of the methods or science of keeping the necessary accounts or records of the busi-

ness and there are schools which provide this training, or it can be gained by experience or the study of certain well-defined principles during actual employment in business. Thus the nature and technical part of a business and the keeping of necessary records are amply provided for by well established agencies, but the acquirement of the knowledge of how best to secure patronage for that business is left to be gathered from experience.

It is manifestly as impossible to give explicit directions for advertising successfully as it is to outline a business policy suitable for the needs or capabilities of *any* who may engage in business. In fact, advertising includes a great deal of what is understood by business policy. Only its minor details can be intelligently presented, and from these the student must build his policy as his business ability allows. His greatest study must be along the lines of psychology, and the more he learns of human nature the more successful will he be.

PREPARING ADVERTISING MATERIAL.

In the preparation of advertising material the method is essentially the same as that for preparing other literary material. Whether a literary production has for its aim the purpose of education or entertainment, there is always an effort on the part of the author to present his ideas in their most inviting dress of words and sentences. This literary ability to tell of things in the most acceptable way is demanded for successful advertising. But it does not follow that an extensive vocabulary is necessary, for some of the most enduring literary productions are written in the simplest style. Reduced to its lowest terms the ability demanded for writing advertising is that for telling in the best possible way those people who want certain things just where, when and how they may procure those things. In every family and with every person the necessity for buying something arises almost daily. There arises with this the questions of where to buy, and the style, quality and desirability of the things to be bought. If advertising is properly done it is an answer to these questions.

This apparent simplicity of the theory of preparing advertising material does not imply that the practice is easy. Advertising is subject to the keenest competition. As there is always a surplus of goods in the hands of traders awaiting the needs of the public, there is necessarily a struggle on the part of the trader to attract people to his wares and away from those of his competitor in trade. This feature of trade has always existed, and modern advertising is but a refinement of method—an employment of the art of letters to secure what was formerly gained by force. It is obvious that the best advertising accomplishes what the strongest force accomplished in more primitive times. Although it unquestionably stimulates people to increased consumption of goods, it is really an engine of trade warfare, and its avowed purpose is to beat down the competition of other traders.

CORRECT BUSINESS METHODS.

As advertising is public notice regarding some features of a business, it follows that if the advertising is to be successful the business must be conducted in such a way that good things may be said about it. Advertising of itself cannot attract permanent patronage to an indifferent or poorly conducted business, any more than an elaborate set of books can show a profit in the transactions of such a business. This suggests that before the book-keeping and advertising branches of a business can perform their functions the business must be placed upon a secure foundation and be conducted properly. The store must be attractive, the goods must be desirable, there must be upright dealing and courtesy and cordiality in intercourse with customers. Advertising a store which does not possess these is a waste of money, and in this connection the advertiser should remember that the public rather than himself is the judge as to whether his business has these qualities. His store and stock are

judged by other stores and compared with the best stores. The study of other stores and stocks is therefore one of the duties of the advertiser.

This insistence upon correctness of business methods and having goods of desirable quantity implies that the strictest honesty in advertising is always the best policy. Some of the most perplexing problems in advertising may be cleared up by putting them to the test of honesty, and many of the seeming difficulties in advertising goods may be simplified by simply resolving to tell the truth about them.

The beginner in retail drug advertising is often handicapped by a superficial observation of the method of others. It is unfortunately the case that a great deal of the advertising which is most prominent by reason of its large space contains much exaggeration. Some of this is quite harmless, however, because the public has been taught by experience to make due allowance for it, but the druggist, by reason of the small extent of his business, its local character, and its professional aspect, should avoid borrowing a style which, while it may attract a general patronage to big concerns whose owners are personally unknown to their patrons, might invite ridicule or distrust if adopted to represent a more modest business.

It is so apparent that the public prefers to bestow its patronage upon traders of unquestioned honesty, that advertising which tends to convey this impression, and goods which are exactly as described in the advertising are two of the best features in a business policy which a druggist may adopt. Giving "good measure," that is, surprising the reader of an advertisement by giving a little more or better than is expected, while it may seem to some a weakness or relaxation from the popular conception of sharp business practice, is in fact an artifice of the most insinuating kind and an action which can have no other effect than attracting and securing permanent patronage. An advertisement of this sort may not be directly profitable in its mission of immediately selling at a profit the goods which it describes, but if it attracts one new customer whose patronage extends over a considerable period of time, its effectiveness cannot be questioned. With this consideration in mind the druggist should construct his advertising so that it will not only sell goods to-day, but so that it will have a good influence indefinitely.

CLASSIFICATION OF MEDIUMS.

Assuming that the importance of correct business principles in connection with advertising is duly recognized, it is next in order to take up the more practical details. With desirable goods in store and people to be attracted to buy them, perhaps the first thing to be considered is the medium to be employed for the advertising. The choice depends upon the size and location of the drug

store. In this a classification may be attempted about as follows:

(1) The drug store located in the business centre of a large city.—Such a store usually has a transient trade, that is, most of its customers are likely to be those who happen to be passing and merely recognize the drug store as a place to supply an immediate need for drugs. Considerations of friendliness for the proprietor or the habit which people acquire of trading at one place do not enter into the matter of patronage for such stores, although their business may be extensive on account of the large number of people who are daily brought to their vicinity. The mediums most suitable for such a store are the attractive show window, card signs, novelties and circulars or cards which may be handed to customers or placed in packages with goods sold. The newspapers of a large city can hardly ever be used with profit by a retail druggist to advertise his general business, although they may be used to advertise a drug specialty and in this way attract general trade indirectly. The general advertising of proprietary articles is, however, a matter hardly within the scope of a majority of retail druggists.

(2) The drug store located in residence portions of large cities.—Such a store is usually in close touch with its customers. Its patronage consists of what is called family trade, and its proprietor may be more or less well known personally to his patrons. The heads of families usually choose it as they do their family physician, and children and servants are usually directed to it when sent upon drug-buying errands. The medium most suitable for advertising such a store are the show window, and circulars and booklets which may be distributed from house to house and to customers in the store. The advertising for such a store may have a great deal of the personality of its proprietor injected into it, and be effective because of the neighborly feeling which may exist between him and his patrons.

(3) The drug store located in small town and cities.—The towns and cities included under this classification are those where the business is usually concentrated within a comparatively small area, where the outlying territory is residential, and where there is little choice between one store or another, so far as its location is concerned. In such towns the personality of the proprietor and clerks and the excellence of advertising are important factors in attracting patronage, and nearly all advertising mediums are profitable. These include daily and weekly newspapers, circulars, booklets, cards and show window.

(4) Drug stores located in small villages.—In such locations there are usually no newspapers, and the advertising mediums available are the circular, booklet, etc. As the druggist usually knows all possible customers in his vicinity and is known by them, his personal qualities and prominence in social and civic affairs may be reckoned as an advertising factor.

ETHER AS LOCAL ANAESTHETIC.—For some years various attempts have been made to treat nerve pains, rheumatism, etc., by the application on the skin of some analgesic, in form of a spray. Some of the substances experimented with have been found unsuitable, while others have not found general application because of high cost. Dr. Hamm has communicated recently to "Therap. Monatsh." a new method which is very cheap and simple. He uses ordinary ether, applied to the skin with an ordinary atomizer. The treatment has been very successful with violent frontal headache of unknown cause, with pains of the trigeminal, influenza-headache, ischias and rheumatic pains. In a large number of experiments the treatment was unsuccessful in only a single case. A single application was usually sufficient. The ether was applied until a thin layer of ice formed upon the skin. No untoward effects were ever noticed and protection of the surrounding parts was found unnecessary. Ether has given immediate and lasting relief in many cases, where other remedies, such as quinine, antipyrine, phenacetine, etc., were without effect. Indiscriminate use of ether by the laity, however, is scarcely advisable, because of the risk of fire as well as its general anesthetic effect. (Drog. Ztg.)

STERILIZATION OF MILK.—According to M. H. de Lavalée, the process of pasteurizing (heating to 70° C.) milk is incapable of destroying the pathogenic germs, and sterilizing by prolonged heating at 100° C. changes the properties of the milk unfavorably. A new method, claimed to be free from these faults, is proposed by de Lavalée, as follows: The milk is transferred as soon as possible after milking to nickel or tin lined vessels and there exposed to the influence of carbon dioxide under a pressure of 5 to 6 atmospheres during 4 or 5 hours. The carbon dioxide is then removed and the milk subjected to the action of pure oxygen under a pressure of 5 atmospheres for 5 hours. This treatment is asserted to kill both the aerobic and the anaerobic bacteria. Milk so treated bears a temperature of 80° to 100° C. without coagulation and keeps two weeks at ordinary temperatures. For transportation the milk is put into large containers and kept under a pressure of 2 atmospheres of oxygen. (Ztsch. ang. Chemie.)

TO REMOVE BLACKHEADS the following mixture is recommended: Lactic acid, boric acid, cerasin, of each 5 parts, high boiling liquid paraffin 30 parts, woolfat 65 parts, castor oil 0.5 part. The face is washed with soap and water just before retiring and then a little of the salve rubbed into the skin. (Drog. Ztg.)

FOREIGN TRADE IN "PATENT" MEDICINES.

Many of the U. S. Consuls in their reports on the drug trade in foreign countries took pains to make lists of the American proprietary medicines sold in their districts. As might be expected, Great Britain and Canada are profitable fields for such goods, and they receive extended mention in the reports. The consul at Geneva furnishes a list of American specialties which makes a quite creditable showing with about 125 preparations. Possibly the most interesting list is that of consul Wilbour, at Dublin, Ireland, who goes to the trouble of informing us as to the comparative demand for various articles. His list is as follows:

Sold in one of the Largest Drug Stores in Dublin.

Large Demand.

Angler's Petroleum Emulsion.
Diamond Dyes.
Carter's Little Liver Pills.
Fellows' Syrup of the Hypophosphites.
Frog in the Throat Lozenges.
Dent's Corn Gum.
Dent's Toothache Gum.
Cuticura Soap.
Cuticura Resolvent.
Cuticura Ointment.
Himrod's Asthma Cure.
Horlick's Malted Milk.
Le Page's Liquid Glue.
Munyon's Homeopathic Remedies.
Williams' Pink Pills.
Packer's Tar Soap.
Sen-Sen Cachous.
Trommer's Mail Preparations.
Vaseline.
Valentine's Meat Juice.
Hood's Sarsaparilla.
Hood's Pills.
Warner's Safe Cure.

Medium Demand.

Antikamnia Powders.
Antikamnia Tablets.
Armour's Preparations.
Aletis Cordial.
Perry Davis' Pain Killer.
Barry's Tricopherous.
Bridal Bouquet Bloom.
Battle's Bromidia.
Enameline.
Cactina Pellets.
California Syrup of Flgs.
Floraline for the Teeth.
Florida Water (Lanman's).
Fairchild's Preparations.
Knapp's Throat Cure.
Koenig's (Pastor) Nerve Cure.
Iron Pills.
Iron Elixir.
Vegetable Pills.
Hockins' Preparations.
Leband's Pastilles.
Lambert's Listerine.
Rough on Rats.
Williams' Shaving Soap.
Warner's Safe Nervine.
Pills.
Wyeth's Preparations.
Pond's Tooth Paste.
Extract.
Peacock's Bromides.
Schieffelin's Pills.
Sanmetto.
Stearns' Headache Cure.
Seabury & Johnson's Preparations.
Celerina.
Parke, Davis & Co.'s Preparations.
Sozodont.

Small Demand.

Allan's Antifal.
Ayer's Sarsaparilla.
Ague Cure.
Cherry Pectoral.
Hair Vigor.
Cathartic Pills.
Dahl's Children's Bread.
Dyspepsia Cakes.
Dr. Pierce's Golden Discovery.
Dr. Pierce's Extract of Smartweed.
Favorite Prescription.
Purgative Pills.
Dr. Hayden's Viburnum Compound.
Bovine.
Benson's Plasters.
Pills.
Emerson's Bromo Seltzer.
Ellis & Golderman's Atomizer.
Carter's Iron Pills.
Nerve Pills.
Liver Bitters.
Plasters.
Chaplin's Buchu Copaliba.
Cuticura Plaster.
Floraline Tooth Powder.

Geddes's Ables Canadensis.
Kennedy's Medical Discovery.
Pinus Canadensis.
Horlick's Dry Milk Extract.
American Hop Bitters.
Horsford's Acid Phosphates.
Hood's Olive Ointment.
Plasters.
Tooth Powder.
Tus Sano.
Keall's Pills.
Lambert's Asthmatic Balsam.
Labeled Hydrangea.
Ingluvin.
Monell's Compound Extract of Copaiba.
Nerve Brain Salt.
Nervo Vito.
Rough on Corns.
Pond's Bunlon Plasters.
Solvent.
Ponds & Coy's Ointment.
Plasters.
Toilet Papers.
Veterinary Remedy.
Phillips' Milk of Magnesia.
Cod Liver Oil Emulsion.
Toothache Stopping.
Paine's Celery Compound.
Packer's Cutaneous Cream.
Stearns' Cascara Aromat.
Hemoferrum.
Wine of Cod Liver Oil.
Swayne's Ointment.
Swift's Blood Specific.
Peptenzyme Powder.
Tablets.
Gomer's Balm.
Clement's Tonic.
Richter's Pain Expeller.
Elixir Lactopeptine.

In connection with this, Mr. Wilbour voices a complaint which has a strangely familiar sound. It is as follows:

"There is a complaint that some American preparations have been largely advertised and considerable call made for the goods, and the retailer stocked. Then the advertising ceased, demand fell off, leaving a stock on hand unsalable. This is mentioned of prominent articles, and gives the retailer cause to hesitate about buying our goods."

Germany discourages patent medicines, but consul Anderson at Hanover and consul Cole at Dresden furnish lists of proprietaries procurable in those cities which remind one of invoices from a patent medicine jobbing house.

FLUID ACETRACTS.

BY JOSEPH H. P. REMINGTON.

Research Committee E., Pharmacopæia Revision.

The title of this paper, "Fluid Acetracts," will doubtless strike the pharmaceutical reader as an innovation and inasmuch as innovations in pharmacy are resented by many, it is only proper to endeavor to forestall unfavorable criticism by giving reasons for selecting a title. To those who have followed the efforts which have been made within the last few years to call attention to the uses of acetic acid as a menstruum and solvent for organic substances, there will be no occasion to explain the meaning of the word *acetracts*. We have had acetic extracts in the past, and by this term is meant a solid extract made from a drug by the use of acetic acid; the word *acetract* may simply be regarded as a contraction of the words *acetic extract*. Inasmuch as the United States Pharmacopæia of 1890 recognizes mainly alcohol and water as menstrua, it would be clearly improper to call preparations made with acetic acid, extracts and fluid extracts; for the sake, then, of avoiding confusion in nomenclature it has been deemed best to use *acetract* and fluid *acetract* to mean solid and liquid preparations of organic drugs made with acetic acid as a menstruum.

Since writing the paper on this subject (which will be found in the American Journal of Pharmacy for March, 1897), the writer has continued experiments upon a number of drugs and has had the opportunity of observing the effect of age upon these preparations, since this paper (March, 1897) was written, the effort has been made to use as weak an acetic acid as possible and, as was anticipated, some drugs can be very successfully exhausted with a menstruum containing as little as 5 per cent. of acetic acid; but so far the strength which seems to be most successful is a 10 per cent. menstruum. It is not to be supposed that acetic acid can replace alcohol as a

menstruum in all cases, but from the work which has already been done, the writer feels warranted in stating that fully one half of the official fluid extracts could be satisfactorily replaced by fluid aëtracts. The manufacturers of specialties have not been slow to adopt acetic acid for extracting drugs, and the saving in expense has been enormous. The cost of diluted acetic acid—10 cents per gallon—as compared with that for alcohol—\$2.50 per gallon—is entirely too great a temptation to resist, and a manufacturer would certainly be foolish to use alcohol except when required by the authority of Pharmacopœia.

Sanguinaria has always presented the greatest difficulty in selecting a menstruum for the fluid extract which would not precipitate the alkaloid. I have great pleasure in stating that this question is now settled so far as obtaining a liquid preparation, which does not precipitate, is concerned. A fluid aëtract of sanguinaria is herewith exhibited, a cubic centimetre representing a gramme of the drug, made on the 27th of July, 1892, and which has never at any time within the last five years, shown the slightest sign of precipitation. It seems necessary, however, to use a 60 per cent. acetic acid to accomplish this, for it will be seen by examining the samples that fluid aëtract of sanguinaria, made with diluted acetic acid, contains an abundant precipitate.

The fluid aëtract of *Ipecacuanha*, made with 60 per cent. acetic acid is two years old, and seems to be in excellent condition, no precipitation being observed. The effect of acetic acid upon pectinuous drugs presents some curious anomalies. Sixty per cent. acetic seems to act as a solvent, for the pectinuous principles, for, whilst weaker strengths produce liquid aëtracts which will gelatinize, no tendency toward gelatinization is observed in the 60 per cent. fluid aëtracts.

One fact is noticeable in light-colored preparations, that is, a tendency to darken with age. The fluid extract of squill herewith shown, was of a light amber color when first made; in two years it has become a clear, dark red. When added to syrup, however, in the proper proportion to make syrup of squill, it will be observed that the resulting preparation is not very different from that which is official.

A fluid aëtract of ergot is very successfully made with a 10 per cent. acetic acid menstruum. Since the publication of the paper above referred to (1897), many letters of inquiry upon the subject have been received, and it is evident that acetic acid is being extensively experimented with in many laboratories. It is with a view of encouraging investigations on this subject that these papers are written, and any information in the possession of the writer will be cheerfully furnished, in the hope that sufficient experience will have accumulated in two years more, to warrant the introduction of some of these preparations in the next Pharmacopœia. Dr. Charles F. Squibb has furnished the writer with nine specimens of fluid aëtracts made with diluted acetic acid, which are submitted to the meeting for inspection. They are as follows: *Digitalis*, *casarea sagrada*, *aconite root*, *nux vomica*, *belladonna leaf*, *compound gentian*, *gelsemium* and *coca*. It will be observed that these represent some of the most important official drugs. They have all been made by reprecipitation, and on the large scale it is found that it is possible, with drugs like *nux vomica*, to use such, very coarsely ground instead of in fine powder, the acetic acid seeming to penetrate hard tissues and to dissolve the active constituents with great facility.

The presence of acetic acid in the finished product is, of course, sometimes objectionable. Practically, this would not be a serious fault in fluid aëtracts made from powerful drugs where the dose is from 2 to 5 minims, given in water, and where only a 10 per cent. acetic acid is used for a menstruum. (*Amer. Jour. Pharm.*)

PREPARATION OF MUSK.—Another addition to the numerous methods of preparing artificial musk is the following: Copal, amber or other resinous substances are distilled in presence of a little magnesia at 240° to 350° C. The heavy oils and wax-like substances so obtained are oxidized at a low temperature with potassium bichromate and sulphuric acid of 60° B_é. The resulting mixture is neutralized with an alcoholic solution of ammonia, heated to expel alcohol, and extracted with ether. After spontaneous evaporation of the ether the odorous product remains behind in form of an oil. (*Ap. Ztg.*)

A NEW SPECTROSCOPE.

What is the most remarkable advance in optical research in many years, in the judgment of experts, is the invention of a new form of spectroscopy by Prof. A. A. Michelson, of the Ryerson Laboratory, University of Chicago. He has been using it this year for investigations of great delicacy, and descriptions of it are now creeping into the technical publications.

The old style of spectroscopy was made with a prism. This broke up a ray of light into the constituent colors and spread them out in a rainbow-tinted band, the red at one end and the violet at the other. If the ray proceeded from the sun, the prismatic ribbon was found to be crossed by a number of black lines. If it emanated from incandescent vapor, the lines were bright instead of dark. The position of these lines along the spectrum, which can be measured with great precision, tells the scientist a good deal about the nature of the substance that emits the light, and reveals something in regard to its motion if, as is often the case, the object under examination be a star.

Naturally, so soon as spectroscopic work was undertaken by the astronomers, it became desirable to stretch a spectrum out as far as possible, in order to separate adjacent lines. Hence a train, or series, of prisms was used, instead of a single prism. Thus a higher "dispersion" was secured, and the lessons of the lines in solar, planetary, and stellar spectra could be more rapidly grasped. With faintly luminous objects, like nebulae and very small stars, only a limited degree of dispersion is practicable; for when a spectrum is greatly expanded it becomes less and less visible, and beyond a certain point it will not reveal anything to the spectroscopist. On the other hand, when the light is intense, like that of the sun, and when it is important to distinguish positively between lines that occupy nearly the same position, the utmost separative power is wanted, and it can be used with safety.

After a little it was found that an excellent spectrum could be obtained by a piece of apparatus quite unlike the prism. A small mirror, slightly concave, was ruled with fine parallel lines. This device, called a "diffraction grating," has been improved wonderfully by Prof. H. A. Rowland, of Johns Hopkins University. His principal achievement in this field was in devising the machinery for ruling the lines. Many of the best gratings are only a few inches in diameter, but have from 10,000 to 20,000 lines to the inch! It is said, though, that the famous ruling engine in Baltimore is capable of cutting over 100,000 lines to the inch. The narrowness of such scratches is almost inconceivable.

The grating is superior to the prism in two respects. It is more compact and manageable and it has a higher dispersive power. In the latter respect, if not in the former, the new instrument of Prof. Michelson surpasses the gratings. The best gratings now in service have a resolving power of 100,000. That of the spectroscopy which Prof. Michelson has recently been using is 300,000, and he expects soon to have one that will rate at 500,000. With such an inquisitor the physicist is sure to get at a host of secrets hitherto beyond his ken.

The general arrangement of this instrument is easily understood even by one who does not master the principle on which it works. A series of glass blocks, shaped something like rather thick dominoes, compose it. An idea of their appearance and position can be obtained by imagining these blocks to be placed on edge, on a table or other horizontal surface, close together, with the face of one against the back of the next. The spectroscopy at the Ryerson Laboratory has eighteen of these pieces and they are all about seven-eighths of an inch thick (13 millimeters, to be exact). It may be assumed that they are all of the same width, say three-quarters of an inch, and as they stand on their edges, the "width" here means height above the surface of the table.

But the lengths vary. If a ruler of other straight edge be brought against the series, so as to bring their left-hand ends in a line, it will be discovered that the other ends do not match, but constitute a regular flight of steps. The first domino is an inch or more long. The second is shorter by 1 millimeter. The third is 2 millimeters shorter. The eighteenth is 18 millimeters shorter, and therefore is not more than a third of an inch long.

When this instrument is in use, the ray of light to be analyzed is sent through the whole series from the wide to the narrow end; and the magnifying apparatus or eyepiece is placed next the latter. It will be perceived, therefore, that if the beam be wide enough, this succession of events will ensue: After going through the first plate in the series, most of the light will pass on through the next one, but a small portion of it will come out into the open air, in consequence of the diminution in size of the second block. That portion which comes out will travel parallel with that which goes into the second plate, but it will move a trifle faster, because the glass offers some resistance to its progress—only a little, yet enough to produce a certain peculiar optical effect.

At each step in the series this phenomenon is repeated. Another small portion of the original beam comes out into the air, but continues to go on in an unchanged direction. At the further end of the instrument, then, there are eighteen slices of the beam, each traveling at a slightly different rate.

The retardation in the progress of the light amounts to 20,000 waves for each plate it goes through. Therefore, the small portion of the original bundle of rays that has traversed the whole eighteen plates is about 360,000 waves behind the portion that did not go through any of them. So soon as one recalls the fact that color is due merely to differences in the rate of vibration, he can see that this gradual retardation must break up the beam, not into all the colors of the rainbow, but into infinitesimally delicate shades of some one hue. The instrument is not intended to give a full spectrum, but to examine microscopically a minute portion of it.

Owing to its peculiar shape, Prof. Michelson calls his device an "echelon spectroscope." Although the design is exceedingly simple, yet the construction is unspeakably difficult. The plan here employed for treating a light ray makes necessary a degree of uniformity in the thickness and levelness of the plates that can scarcely be imagined by the uninitiated. Workmanship of the most wonderful precision is required in the process of manufacture. In practice, the optician would make one little plate of glass of the proper thickness and smoothness, having, as the mathematicians say, "perfectly plane and parallel surfaces," and then cut this up into the proper number of pieces.—New York Tribune; (Sci.Am.)

SOME INCOMPATIBILITIES.

M. Mausier, writing in the Centre Medical et Pharmaceutique, of Gannat, (Nat. Dr.), says: The ever-increasing number of illogical prescriptions, or prescriptions written off without that care and deliberation that are to be desired, induces me to draw attention to certain incompatibilities of more or less frequent recurrence.

First and foremost, I would mention mixtures of tinctures. This class being the product of the action of alcohol on vegetable principles, would at first seem to be peculiarly adapted to mixtures of the most complicated description, yet, as an actual fact, the opposite is the result. Thus we see, every day, tincture of calumbo associated with tincture of cola, or cinchona, or canella, tinctures gorged with tannin, which at once precipitate the active principle of calumbo (menispermene) and leave the mixture almost inert, on account of the loss, on the one side, of astringent and, on the other, of active principles.

Cocaine hydrochlorate should never be added to saturated chloroform water. Chloroform, being much less soluble in water containing the cocaine salt than in pure water, the result of the addition of cocaine to the chloroform water is the precipitation of chloroform in very minute drops, which find their way to the bottom of the container. When it becomes necessary or desirable to use the combination, the chloroform water of 58 per cent. (or saturation) should be employed—or, if one must prescribe the saturated water, he should add either 1 per cent. of citric acid or 5 per cent. of alcohol to the mixture—both of which augment the solubility of chloroform in water.

I would add that saturated chloroform water, on account of this reaction, may serve as a reagent in the identification of cocaine. Of over a dozen of the alkaloids in common use tested by me, the salts of cocaine alone

caused the precipitation of chloroform from its saturated aqueous solution.

Physicians and dentists are fond of prescribing a certain mixture of potassium chlorate and alum, or aluminum sulphate. Each substance has long enjoyed a certain popularity in the hygiene and therapeutics of the mouth and throat, but in the combination of the two, one risks the loss of a large amount of the effect which either of them, employed by itself, would achieve. In a mixture of their solutions, while no change visible to the eye occurs, yet there is a chemical modification, in which chlorine is set free, a fact easily demonstrated by any of the tests for free chlorine (amidonated potassium iodide, indigo sulphate, ammonium sulphocyanide and a proto-salt of iron, etc.).

This change is due, it is believed, to the action of the alum, or the aluminum sulphate, on the potassium chlorate (which is identical with that of a weak solution of sulphuric acid), and in which the liberated chlorine is converted into hydrochloric acid, gradually and continuously, as long as it is liberated. While it is possible, in spite of this, that the association of the medicaments may present certain therapeutical advantages, it is nevertheless important that the physician should be aware of the fact of the chemical change which takes place.

I would like to call special attention to the following mixture, because there is nothing in the nature of the ingredients that would suggest an incompatibility between them, or, in fact, any inconvenience in combining them. I have had to put up, quite a number of times, a pomade containing, among other things, potassium iodide and mercurial ointment. Every time that this ointment is applied, it produces an erythema, finishing with blisters.

Now, while, *a priori*, there would seem to be no counter-indication to the mixture of potassium iodide and mercurial ointment, nevertheless I have determined the existence in the unguent thus prepared, of mercurous and mercuric iodides, the two haloidal salts being formed simultaneously during the trituration of the substances, and not subsequently, as one would naturally imagine. Of this I shall have something more to say in a subsequent communication.

THE YUCCA PLANT IN VENEZUELA.

The great staple of Venezuela is coffee; but, as the prices are now very low, it might be well if farmers would turn their attention to other plants which give a more lucrative return. The yucca (cassava) appears to have a great future before it.

This is a very productive plant, and, although well known in Venezuela, no one has yet taken special pains to develop it.

One hectare (2.47 acres) of land upon which yucca is grown will produce 150 quintals (15,000 pounds) of starch, or 200 quintals (20,000 pounds) of tapioca. The plant is easily and cheaply cultivated. It will stand bad weather, and the dry season does not affect it. It can be raised on any soil.

The yucca will thrive in the same soil with peas, corn, and beans, and ground so utilized becomes far more remunerative than land planted in coffee. One hectare of tilled soil will produce 1,600 coffee plants. Allowing the maximum yield of coffee per plant, a hectare will produce 8 quintals of coffee. On the same ground the yucca with yield 150 quintals of starch, exclusive of other crops, from the same soil. These other crops will aggregate 12 bushels of corn, 12 bushels of peas, and 12 bushels of beans. This will make land in which the yucca is planted from six to seven times as remunerative as when planted in coffee.

Means of cultivation are primitive. Plows and other modern American farming implements are almost unknown here. Some years ago I ordered for a friend some light "Avery" plows; but they have not been used, as neither men nor beasts are trained for them. All the work is done with old-fashioned hoes. E. H. Plummer, U. S. Consul.

TO REMOVE IODOFORM ODOR from the hands the Drog. Zig. recommends orange flower water. The hands are moistened or sprayed with the water, which has the power of rendering the iodoform odorless, doubtless through the formation of some odorless compound.

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

An Error Corrected.

It was erroneously stated in a recent issue of this paper that reply to a query from Samuel Kidder, Jr., Bad Axe, Mich., was withheld on the ground that he was not a subscriber, and therefore not entitled to the services of this department. The circumstance is all the more regretted from the fact that Mr. Kidder is and has been for a long time one of our most valued subscribers. The error was purely a clerical one, wholly unexplainable.

Spotting Cigar Wrappers.

(R. L. B.) See this journal, Oct. 27, 1898, page 573.

Medical Times.

(Subscriber) The "Medical Times" is published at No. 108 Fulton street, this city.

Vitae-Ore.

(D. C.) "Vitae-Ore" is a proprietary article, manufactured in Chicago, and, of course, we cannot give the formula, although a contemporary stated several years ago that "it is believed to be a sulphide of iron." Its value and popularity are, perhaps, best known to the proprietor.

Mug (Muck) Iron.

(H. & C.) By "mug" iron is probably meant "muck" or bar iron, a term used by manufacturers to denote the iron when it has reached a certain stage in the process of puddling. Iron in this condition is also called "puddled" or "muck bar." Before it is ready for the market the slab or bar of iron must be re-heated and again rolled.

Chemistry at the Cooper Institute.

(H. M.) Chemistry is one of the branches taught in the Cooper Union Free Night School of Science, this city. For particulars as to the scope of the work, etc., you should apply in person at the Institute, or you may address the superintendent of the school, care of the Institute, Seventh street and Third avenue, New York.

Wine of Cod Liver Oil.

(J. W. S.) An alcoholic extract of cod liver oil is prepared by extracting the oil with 90 per cent. alcohol and then evaporating the alcohol. The extract is known as morrhuaol, and claimed to represent all of the valuable properties of cod liver oil. Formulas for several so-called "tasteless" preparations in which this product is used may be found in the issues of the Era for Sept. 23, 1897, page 422, and Jan. 6, 1898, page 15.

Commercial Carbolic Acid.

(H.) asks what should be dispensed for "commercial carbolic acid" in the following prescription:

Acid carbolic, commercial,
Glycerin, of each..... 1 fl. ounce

Mix. Use as directed for vaginal douche, with hot water.

"Commercial carbolic acid" is a rather indefinite term, although it has been applied to the impure liquid acid sold in the shops, which Squibb says usually contains from 70 to 90 per cent. of carbolic and cresylic acids jointly, the latter acid being said to be quite equal to the former in disinfecting power. It may be possible this impure acid is what the prescriber in mind, though we hardly think so. It is more likely he wanted the liquefied acid made by the addition to the crystalline acid of about 5 per cent. of water. This acid should not be used, however, without consulting the prescriber, as his directions to the patient are very indefinite and give the

compounder no idea how strong the solution should be made.

Sodium Bisulphite.

(C. E. W.) Sodium bisulphite is commercially prepared by saturating a solution of sodium carbonate with sulphur dioxide and crystallizing in a cool place. Warm concentrated solutions treated in this manner usually separate on cooling sodium pyrosulphite, $\text{Na}_2\text{S}_2\text{O}_5$. Sodium sulphite is employed in the arts for bleaching, and as a preservative for meats and vegetable juices. Chaudet, who, it is said, first recommended it for bleaching purposes, gave it the name of leucogene.

To Preserve Autumn Leaves.

(J. H. C.) The Era Formulary gives the following process: Dry as quickly as possible by putting the leaves between the folds of a very absorbent paper, and change frequently, as often as once a day. A warm flat iron judiciously used will help the druggist but on heating will spoil all. When the leaves are quickly and thoroughly dried, they will retain their colors for several months. In making up ornamental work, the leaves should have a light coat of boiled linseed oil. This brings out the color, and gives a more natural color appearance than varnish of any kind. For fastening the leaves to cardboard or any other support, glue is best. Do not oil the under sides of the leaves, as this will prevent the glue from adhering.

Regulations Governing the Practice of Pharmacy in Alabama.

(M. C. K.) Applicants who desire to become registered as pharmacists in Alabama are required to pass an examination before the Board of Pharmacy. Or, if the applicant be a graduate of a college of pharmacy requiring practical experience in pharmacy of not less than four years before granting a diploma, he is entitled to registration by the board without examination. The fee for registration by examination is \$5. In case this examination is defective and unsatisfactory to the board the applicant is permitted to again present himself for examination within any period not exceeding twelve months from the date of his first examination. No charge is made for the second examination. The fee for registration upon diploma is \$3. Section 12 of the pharmacy law, as amended in 1897, requires that every registered pharmacist shall be held responsible for the quality of all drugs, chemicals or medicines he may sell or dispense, with the exception of those sold in original packages of the manufacturer, and also proprietary medicines. The pharmacy act does not apply to physicians putting up their own prescriptions. Any person not a pharmacist or a druggist may open and conduct a store if he keeps constantly in his employ a registered pharmacist. The law applies to all cities, towns and villages of more than 500 inhabitants and to all districts within two miles of any incorporated city or town of more than 500. The secretary of the Board of Pharmacy is E. P. Galt, Selma.

Scruples and Minims.

(W. T. S.) received the following prescriptions:

- | | | |
|-----|--------------------------|-----------|
| (1) | B | |
| | Tinct. strophanthi | 5v-9j |
| | Tinct. digitalis | 3ij |
| | Tinct. nux vomica | 3v |
| | Aqua | ad. 3vj |
| (2) | B | |
| | Acid. salicylic | 3i-3ij |
| | Sodii bicarb. | 3v-9j |
| | Glycerin | 3ss |
| | Aqua | ad. 3viij |

He wants to know the meaning of the sign for scruples as here used, "Is it not used to blind some one?" We think not. The prescriber has incorrectly written it in the first prescription, doubtless meaning 5 1-3 fl. dr., associating the value of one scruple in grains (20) with an equal number of minims (20). This is quite apparent when we consider the probable dose of tincture of strophanthus as ten minims. The dose of the mixture is not given, but it may be assumed to be one teaspoonful (one fl. dram). In the mixture there are then 32 fluid drams or doses, each containing 10 minims of tincture of strophanthus or 320 minims in all, equivalent to 5 fl. drams and 20 minims. In the second prescription the scruple sign is correctly used, indicating that

the prescriber wished to employ 2 drams and 2 scruples of salicylic acid, and 5 drams and one scruple of sodium bicarbonate. There is considerably more sodium bicarbonate called for than is necessary to neutralize the salicylic acid. The prescription may be safely dispensed, allowing, of course, sufficient time to elapse before bottling. This should not be done until effervescence has entirely ceased.

Compound Eclectic Syrup.

(Kings) Compound syrup of pokeroor, compound syrup of rhubarb and potassium, and compound syrup of yellow dock are preparations greatly esteemed by eclectic practitioners. They are made as follows:

Compound Syrup of Poke Root.

Poke root	640 grains
American ivy bark	640 grains
Black cohosh	320 grains
Sheep laurel	320 grains
Oil of sassafras	3 drops
Oil of wintergreen	3 drops
Sugar	10 av. ounces
Alcohol, Water, ...	
Simple syrup, of each	sufficient

Mix the drugs, reduce to fine powder, add the oils, and extract by percolation so as to obtain 10 fluid ounces of percolate, using as a menstruum a mixture of 1 part of alcohol by measure, and 2 of water. In this dissolve the sugar, and then add enough simple syrup to make 16 fluid ounces.

Syrup of Rhubarb and Potassium Compound.

Rhubarb	240 grains
Hydrastis	120 grains
Cinnamon	120 grains
Potassium carbonate	240 grains
Oil of peppermint	5 drops
Sugar	14 av. ounces
Alcohol	8 fl. ounces
Water	16 fl. ounces

Dissolve the potassium carbonate in a portion of water and mix in a suitable sized container with the rhubarb, hydrastis and cinnamon, the last three being in fine powder. Now add the alcohol and the remainder of the water and allow to stand for 48 hours, agitating the whole briskly at frequent intervals. Decant the clear portion, and filter the remainder through absorbent cotton, adding sufficient water through the filter to make the whole measure 24 fluid ounces. In this dissolve the sugar by agitation, and add the oil of peppermint.

Compound Syrup of Yellow Dock.

Yellow dock	480 grains
False bitter-sweet	240 grains
American ivy bark	120 grains
Figwort	120 grains
Alcohol, Water, of each	sufficient
Sugar	10 av. ounces

Mix the drug, reduce to fine powder and extract by percolation so as to obtain 10 fluid ounces of product, using a menstruum composed of 1 part of alcohol by measure to 2 of water; in this percolate dissolve the sugar by agitation or percolation.

Laxative Tea.

(R. A. D.) As a rule, the so-called "tea mixtures" are made of crude drugs after the manner of the "Species" of the German Pharmacopoeia. The National Formulary also gives three formulas for mixtures of this kind. The following formulas produces a satisfactory laxative tea:

(1) Moisten 25 parts of cut senna with a small quantity of water, and sprinkle over it as uniformly as possible 5 parts of bitartrate of potassium, allow to dry and then mix lightly with 4 parts each of althaea, licorice root, anise, fennel and couch grass, all bruised and cut to suitable size.

(2) Buckthorn bark	4 ounces
Dandelion root	4 ounces
Senna leaves	4 ounces
Licorice root	1 ounce
Coriander seed	1/4 ounce
Anise seed	1/2 ounce

Reduce the drugs to a coarse powder and mix uniformly. The cathartic effect of this remedy may be increased by introducing a proper quantity of coarsely ground rhubarb. The decoction or "tea" is made from the mixture by steeping one tablespoonful in about three-quarters of a pint of hot water and allowing it to stand

about thirty minutes. An adult dose of this is about a teaspoonful.

(3) The following formula is well known in Germany under the title "Species laxantes regias":

Senna leaves	15 grams
Rose leaves, Licorice root, Polyopodium root, Dulcamara, of each	10 grams
Aniseed	5 grams

(4) A "tea" containing the substances you name may be made as follows:

Senna	4 ounces
Fennel seed	1 ounce
Celery seed	2 ounces
Gentian root	1 ounce
Red clover blossoms	2 ounces

Reduce to a powder and mix uniformly.

We do not know that golden-rod (leaves and blossoms) is ever used in mixtures of this character, though there is no reason why it may not be so used. The dried flowers and leaves are slightly aromatic and carminative, and, like other substances of the same class, diaphoretic when given in warm infusion. Infusion made from the leaves is a well-known domestic remedy to allay colic.

THE SENSE OF TASTE AT VARIOUS TEMPERATURES.—Dr. Mendelsohn publishes some interesting observations on this subject. The differences in taste are merely qualitative and depend upon the varying intensity in the transmission through the sensory nerves and nerves of taste. Taste is much influenced by considerable differences in temperature, and may temporarily even be stopped entirely. If, for example, the tongue be held for about one minute in water of 50° to 52° C., the sense of taste for cane sugar is completely lost for the time being. If the tongue be held about 40 seconds in cold water of 1° to 10° C., the power of tasting is entirely lost for a time. The sense of taste is strongest between 10° and 20° C. Beverages having this temperature are also the best for quenching thirst. Water of 3° to 5° C., which is usually looked upon as the best for relieving thirst, on the other hand is in reality much less suitable for this than water having a temperature of 12° to 14° C. (Südd. Ap. Ztg.)

WATER SOLUBLE COMPOUND OF CASEIN AND CALCIUM PHOSPHATE.—A solution of casein is precipitated with a neutral solution of calcium glycerophosphate. The soft, flocculent precipitate of casein-calcium glycerophosphate is well washed with water and dried at 100° C. The product is insoluble in water, but is readily soluble without decomposition in dilute alkalis. To convert this compound into the soluble form, 10 kg. of the dry powder are carefully mixed with a freshly prepared solution of 17.25 Gm. of metallic sodium or 20.15 Gm. of potassium in the smallest possible quantity of absolute alcohol, which is mixed with 3 to 4 times its volume of anhydrous ether. The mass, which is formed, is dried at 80°. Instead of the alkali metals a corresponding quantity of hydrate in alcoholic aqueous solutions may be used. The final product is a grayish white powder, readily soluble in water, and of neutral reaction. It is decomposed by acids, the casein being thrown out in form of very fine, delicate flakes. (Südd. Ap. Ztg.)

EXTRACT OF QUILLAYA BARK is purified by Kaufmann as follows: The extract is very slowly evaporated in shallow pans, which causes the resinous matter present to sink to the bottom. The clear supernatant liquid is drawn off and slimy substances still present removed by digestion with zinc dust and oxalic acid or sulphurous acid. The zinc salt thus formed and thrown down in insoluble form carries down with it the mucilaginous matter, while the extract is bleached by the nascent hydrogen. (Ztch. ang. Chem.)

MILK-COGNAC, as prepared by Born, is a mixture of condensed milk and cognac, having been found to have the following composition: Alcohol 17.4 p. c., mineral matter 0.9 p. c., milk fat 2.7 p. c., proteins 3.8 p. c., non-nitrogenous extractive matter (including 30.1 p. c. sugar) 35.9 p. c., water 39.2 p. c. (Ap. Ztg.)

The Era Course in Pharmacy.

CONTRIBUTORS

Elies H. Bartley, M.D., Ph.G.
Emil L. Boerner, Ph.D.
Virgil Coblenz, A.M., Ph.D.
Wilber G. Compher, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heebner, Phm.B., Ph.G.
George E. Kaufman, B.Sc., Ph.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G., Ph.D.
Edward Kremers, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.
CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison.
Oscar Oldberg, Ph.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Reed, M.D., C.M.
Edsel A. Rudiman, Ph.M., M.D.
Henry H. Rusty, M.D.
Samuel P. Sadtler, Ph.D.
L. F. Sayre, B.Sc., Ph.M.
Wilbur L. Seville, Ph.G.
William S. Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Storrer, Ph.G.
Frederick J. Wulling, Ph.C., Phm.D.

JUNIOR COURSE. LECTURE NO. 19.

Inorganic Chemistry.

The Oxygen Group.—Concluded. Nitrogen Group.

TELLURIUM.

Symbol Te. Valence, 2, 4, 6. Atomic Weight, 126.52.

Historical.—Tellurium has been known in the form of its ores for a considerable time, but the final demonstration of its elemental nature was made by Klaproth in 1798. Its chemical activity and the properties of its compounds were first accurately studied by Berzelius. Its name is derived from *tellus*, the earth.

Natural Sources.—Tellurium exists to some extent in the native condition, but mainly as the tellurides of lead, bismuth, silver, and gold. It also occurs to some extent as the trioxid or tellurium ochre, TeO_3 .

Preparation.—The metal is extracted from its ores by fusing them with an alkaline carbonate, whereby an alkaline tellurid is formed, which is then dissolved out by water and the solution allowed to stand until it decomposes and the tellurium is deposited. Or the ore may be treated with hydrochloric or sulfuric acid, and the resulting solution treated with zinc to throw out the tellurium.

Physical Characters.—Tellurium is a bluish-white solid, of a brilliant metallic luster, and has a specific gravity of 6.24. In its physical characters it resembles the metals, especially antimony.

It melts at about 500° , and can be distilled unchanged in the presence of hydrogen, but not in air. Unlike sulfur and selenium, tellurium is not soluble in carbon disulfid.

Chemical Properties.—In its chemical properties tellurium is a non-metal, closely resembling sulfur and selenium, except that its basic properties are somewhat more strongly marked, and its acid compounds are correspondingly more unstable. When heated in the air it burns with a blue-green flame, and yields white vapors of the dioxid. It is soluble in hot solutions of the alkalis and in concentrated sulfuric acid. Hydrochloric acid is without effect.

Uses.—The principal employment of tellurium at present is for the preparation of its compounds, and of the latter for experimental purposes.

Characteristic Reactions.—The element dissolves in hot, concentrated solutions of potassium hydrate, and on dilution with water is precipitated in brownish flakes. Tellurates by boiling with hydrochloric acid are reduced to tellurites, which precipitate on dilution. From tellurous salts, hydrogen sulfid precipitates the brown disulfid, TeS_2 .

Compounds of Tellurium.

Hydrogen tellurid, H_2Te .—A colorless gas of a disagreeable odor, resembling that of hydrogen sulfid. It is prepared by heating tellurium in a current of hydrogen or by the solution of zinc tellurid in hydrochloric acid.



In most of its properties it resembles the hydrogen compounds of sulfur and selenium. It is very unstable, decomposing instantly in moist air. In solution it forms precipitates of tellurids with many of the heavy metals.

Halogen Compounds.—With chlorine, bromine, iodine and fluorine, it forms compounds similar to the corresponding compounds of these elements with sulfur and selenium, but which are somewhat more stable.

Tellurium monoxid, TeO , is prepared by heating tellurous sulfate in a vacuum until sulfur dioxide ceases to be given off, powdering, washing and drying the residue. It forms a brownish-black amorphous powder, which shows a graphitic luster when rubbed with a hard body.

Tellurium dioxid, or tellurous oxid, TeO_2 , is produced by the oxidation of tellurium by nitric acid, or by heating tellurous acid until deprived of water. It forms a white, crystalline solid, and is regarded as the anhydrid of tellurous acid, H_2TeO_3 , a white, amorphous solid, prepared by dissolving tellurium in nitric acid, and precipitating by water before the dioxid has time to form.

Tellurium trioxid, or telluric oxid, TeO_3 , is prepared by heating telluric acid to 160°C . It is an orange-yellow, crystalline mass, and is the anhydrid of telluric acid, H_2TeO_4 . The latter compound exists in white monacid, H_2TeO_4 . The latter compound exists in white monclinic crystals resembling gypsum. It is slightly soluble in cold, more freely in hot water.

REVIEW OF THE OXYGEN GROUP

Of the four elements just studied, oxygen exhibits the group characteristics in the smallest degree. The many analogies of its compounds to those of sulfur, however, justify its inclusion in the group.

All form binary compounds with hydrogen, though the oxygen compound, H_2O , differs very widely in its properties, both chemical and physical, from those of the hydrogen compounds of the other elements.

The three elements, Sulfur, Selenium and Tellurium, exhibit many characters in common. The similarity of their gaseous hydrogen compounds in molecular structure, method of preparation, and their characteristic properties, such as odor, and precipitation of the heavy metals, is especially well marked. Like points of similarity can be traced between the dioxids and trioxids, and their corresponding acids and salts.

As in the Chlorin group, there is not only a parallelism between the several elements of the group, but a more or less progressive change in properties. This is seen in the increase of specific gravity of the free elements, and a

similar increase in the density of their oxides and oxygen acids as the atomic weight rises from oxygen to tellurium.

A corresponding progression is seen in the change from the decided non-metallic properties of oxygen, to the marked metallic qualities of tellurium, and in the decreasing stability of their hydrogen compounds from the comparatively stable hydrogen sulfid to the very unstable hydrogen tellurid.

There is also a noticeable decrease in solubility in carbon disulfid, from sulfur, which is freely soluble in that liquid, to tellurium, which is insoluble. The salts of the most highly oxidized acids, as the sulfates, selenites, and tellurates, also exhibit a similar modification of solubility in water in passing from the first to the last.

NITROGEN GROUP.

Nitrogen. Phosphorus. Arsenic. Antimony. Bismuth.

The elements of this family are all of very great economic importance, both in the free state and in the form of their compounds.

As the members of the oxygen group presented an advance in metallic properties over the chlorine group, so the nitrogen group in turn presents a still farther advance in the same direction. This fact is most evident by comparing the first and last members of the present group with the first and last members of the other two groups.

Fluorin is distinguished by most intense chemical activity and non-metallic properties. Oxygen is also a very active element, but less energetic than Fluorin, while Nitrogen, of the present group, is noted for its inactivity. Iodin, the last member of the first group, presents a very slight advance toward metallicity, tellurium, the last member of the second group, exhibits some marked metallic qualities, while bismuth is an undoubted metal.

NITROGEN.

Symbol N. Valence, 1, 3, 5. Atomic Weight, 13.93.

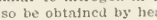
Historical.—Nitrogen was first distinctly pointed out by Scheele, though it had previously been observed by Rutherford in 1772, who, however, failed to perceive its elementary character. Lavoisier recognized it as an elementary substance, and gave it the name *azote*, from its inability to sustain life, by which name it is still known to French chemists. The present name was suggested by Chaptal, from *nitron*, the Greek name for saltpetre, and *gennao*, I generate, in allusion to the fact that it is a constituent of that substance.

Natural Sources.—Nitrogen constitutes about four-fifths by volume of the earth's atmosphere. It is also found in combination in a large number of animal and vegetable substances, and in many inorganic compounds, such as the nitrates and ammonia salts.

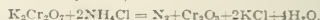
Preparation.—The simplest method of obtaining nitrogen is by removing the oxygen from the air by the combustion of phosphorus in a closed vessel. (Fig. 31.) As obtained by this method, it is always contaminated by a small residue of oxygen, and by other normal constituents of the atmosphere, but is sufficiently pure for the purposes of the student.

Nearly pure nitrogen can be obtained by passing air, first over potassium hydroxid to deprive it of carbon dioxide, then through sulfuric acid to remove moisture, and finally through a tube heated to red heat and containing copper filings, with which the oxygen unites, and collecting the residual nitrogen in a receiver beyond. The gas prepared in this manner still contains a small amount of Argon, and possibly traces of other elements of the atmosphere which are very similar to nitrogen in their properties.

Nitrogen can also be obtained by heating certain easily decomposable compounds of ammonia. A concentrated solution of ammonium nitrate when heated splits up into nitrogen and water.



A mixture of potassium dichromate and ammonium chlorid when heated yields nitrogen, with reduction of the chromium to sesquioxide, thus:



Nitrogen may also be obtained by the action of chlorine on ammonia, though this reaction is a hazardous one on account of the liability to the formation of the dangerously explosive nitrogen chlorid.

Physical Characters.—Nitrogen is an odorless, colorless and tasteless gas. Its density is 0.9713 as compared with air. It is only slightly soluble in water. Like other gaseous elements it can be condensed by cold and pressure to the state of a liquid.

Chemical Properties.—The most distinctive character of nitrogen is its inertness in the free state, though many of its compounds are very active substances. It is neither combustible nor a supporter of combustion. It unites directly with only a few other elements and with these only with difficulty. Indirectly it combines to form a large number of important compounds.

Uses.—In the atmosphere the nitrogen, which constitutes four-fifths of its volume, acts mainly as a diluent of the oxygen, and thus moderates the intensity of the reaction of the latter in its combinations with the other elements. While nitrogen is an essential to animal life, animals cannot make use of the atmospheric supply, but are forced to rely exclusively upon that contained in the tissues of the higher plants. The latter organisms obtain their supply from the ammonia and oxidized forms of nitrogen in the soil, while the transforming of free into combining nitrogen for use of the higher plants seems to be largely the work of certain species of vegetable micro-organisms, examples of which are found in the tubercles which occur on roots of plants belonging to the order Leguminosae.

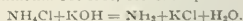
Compounds of Nitrogen.

Hydrogen Compounds.—Nitrogen forms three compounds with hydrogen, Ammonia, NH_3 , Hydrazin, N_2H_4 , and Azomid, N_2H .

Ammonia, NH_3 , can be formed artificially by the direct union of nitrogen and hydrogen by causing electric sparks to pass through a mixture of the gases, but this process is of scientific interest only, and is never employed in the practical production of the compound.

Ammonia is produced naturally in the putrefaction of nitrogenous animal and vegetable substances. It also results from the dry or destructive distillation of organic matter containing nitrogen, the principal commercial source of its compounds being the ammoniacal liquor formed as a by-product in the destructive distillation of coal in the manufacture of illuminating gas.

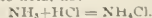
For experimental purposes it is generally obtained by the action of one of the fixed alkalies or alkaline earths upon an ammonium compound, when the latter is decomposed and ammonia set free, for example:



Ammonia is a colorless gas of a very peculiar, pungent, alkaline odor and strong, caustic taste. It has an alkaline reaction with litmus and other indicators, and unites readily with acids to form salts, which bear a strong resemblance to the salts of the alkali metals. Because of its volatility and strongly alkaline qualities it is sometimes called the *volatile alkali*, to distinguish it from the fixed or true alkalies.

By means of cold and pressure ammonia is quickly reduced to a liquid, boiling at -33.7°C . Since a liquid cannot vaporize without absorbing large quantities of heat, the evaporation of liquefied ammonia may be utilized in the manufacture of artificial ice. The water to be frozen is surrounded by hollow vessels filled with the liquid ammonia, which by means of pumps is then caused to evaporate rapidly, and in so doing absorbs sufficient heat to cause the freezing of the water which it surrounds.

When ammonia is brought into contact with an acid the two unite to form a salt, but without the elimination of the hydrogen of the acid, as:

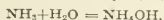


The existence of the group NH_4 is therefore assumed as the basis of these salts and the name *ammonium* given to it. This radical, however, cannot exist in the free state, and is known only as a component of the ammonium salts.



Fig. 31.—Preparing Nitrogen remove moisture, and finally by Removing Oxygen from through a tube heated to red heat and containing copper filings, with which the oxygen unites, and collecting the residual nitrogen in a receiver beyond. The gas prepared in this manner still contains a small amount of Argon, and possibly traces of other elements of the atmosphere which are very similar to nitrogen in their properties.

Ammonia gas, NH_3 , is very soluble in cold water, no less than 1100 volumes of the gas being absorbed by that liquid at 0°C . The dissolved gas is assumed to combine with water to form ammonium hydroxide, NH_4OH , thus:



The actual existence of the compound NH_4OH is somewhat doubtful, but it is practically convenient to consider it as a constituent of the aqueous solution.

The U. S. P. contains three preparations of the gas, *Aqua Ammonia*, a 10 per cent aqueous solution, *Aqua Ammonia Fortior*, a 28 per cent. aqueous solution, and *Spiritus Ammonia*, a ten per cent. alcoholic solution. It is also employed in several other official preparations.

Hydrazin. N_2H_4 , is obtained in a manner similar to ammonia, and has similar properties, though it is less strongly alkaline.

Azoid, Hydrazoic or Hydronitric Acid. N_2H , is obtained by oxidizing a solution of hydrazin by means of nitrous acid. It is a colorless, irritating gas, soluble in water, and has strongly acid properties. It dissolves such metals as copper, aluminum and zinc, forming nitrides. It is extremely unstable, and explodes with great violence from the slightest jar or shock.

Halogen Compounds.—With chlorine, bromin and iodine, nitrogen forms compounds which are violently explosive, even the motion of the vessel or a bright light being sufficient to cause their decomposition. For this reason it is never safe to bring ammonia in contact with either of these elements in the free state, unless the alkali be greatly in excess.

The loid of nitrogen, NI_3 , is the least dangerous of the three.

Oxygen Compounds.—Five oxids of nitrogen are known. They are:

N_2O Nitrogen Monoxid.

N_2O_2 Nitrogen Dioxid.

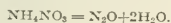
N_2O_3 Nitrogen Trioxid.

N_2O_4 Nitrogen Tetroxid.

N_2O_5 Nitrogen Pentoxid.

Nitrogen can be made to combine with oxygen by passing electric sparks through a mixture of the elements, but the oxids are usually prepared from nitric acid as the starting point.

Nitrogen Monoxid. or Nitrous Oxid, N_2O , can be made by the reduction of nitric oxid by iron filings, or by other reducing agents, but is usually prepared by heating ammonium nitrate, which decomposes into nitrous oxid and water.



Nitrous Oxid is a colorless gas of a rather pleasant,

sweetish taste and smell. When inhaled it causes a kind of mental exhilaration or intoxication, frequently accompanied by an inclination to laughter, hence the name "laughing gas" applied to it. Under various names, and sometimes mixed with other substances, it is much used in dentistry as an anesthetic. Its use may be attended by fatal results if too long continued, or if improperly administered.

It is slightly soluble in cold water, less so in warm. Owing to the ease with which it parts with its oxygen it supports combustion nearly as well as the latter gas. Nitrous oxid is the theoretical anhydride of hyponitrous acid, though the acid cannot be prepared from it.

PRACTICAL STUDIES.

1. Place a piece of phosphorus as big as a pea in a tin box lid and float it on water contained in a pan or other vessel. Ignite the phosphorus and invert over it a glass jar or wide mouth bottle. (Fig. 31). The phosphorus pentoxid which gradually dissolves in the water, the latter meanwhile rising in the jar to take the place of the consumed oxygen. (CAUTION: Do not handle phosphorus with the naked fingers.)

Cover the mouth of the jar while still under water with a piece of glass, invert and remove from the water. The jar, of course, still retains the water which took the place of the oxygen. Test the combustibility of the gas by lowering into it a burning splinter. What occurs?

2. Examine about two grams of powdered ammonium chlorid. Has it any odor? Add to it an equal bulk of dry calcium oxid (Lime), mix and place in a dry test tube and heat over an alcohol lamp or gas burner. Has the mixture after heating any odor not possessed by either constituent? What is it? Hold in the mouth of the tube a piece of red and a piece of blue litmus paper, first dry and then moistened. What occurs? Bring to the mouth of the test tube a glass rod or stopper wet with hydrochloric acid, and note the result.

Any ammonium salt may be used in place of the chlorid, and either potassium or sodium hydroxid, dry or in solution, in place of the lime.

Write equations showing the probable reaction of calcium oxid and ammonium chlorid, also showing the reaction between hydrochloric acid and ammonia gas.

3. Heat about 5 Gm. dry ammonium nitrate in a test tube and test the evolved gas with a glowing coal, as in the experiment with oxygen. Commonly this experiment will be found more difficult of performance than the one with oxygen. Show by an equation the decomposition of the ammonium salt into nitrous oxid and water.

JUNIOR COURSE. LECTURE No. 20.

Pharmaceutical Physics.

Effects of Heat.

When heat is applied to any substance any one or all of the following phenomena may occur: Rise of Temperature, Expansion, Fusion or Vaporization.

The most common result of the application of heat is to cause a rise of temperature in the object to which the heat is applied, but the extent to which this takes place in any given substance depends upon its Specific Heat.

Specific Heat.—It is frequently observed that different bodies are not equally susceptible to the effects of heat, or, as commonly expressed, that different substances have different capacities for heat. For example, if a piece of iron and an equal weight of water are exposed to equal sources of heat, the iron soon becomes too hot to hold in the hand, while the water is only slightly warmed. It can be shown by experiment that the quantity of heat which will raise a kilogram of water to 100°C . will raise an equal weight of iron to 900°C , or to a bright red heat. In other words, water has a greater capacity for heat than iron. The heat capacity of a substance is measured by the number of thermal units required to raise its temperature 1°C , and is always the same under the same conditions.

The ratio of the heat capacity of a substance to the heat capacity of water is called "Specific Heat," water

being selected as the standard owing to the fact that it has a higher specific heat than any other substance except hydrogen. It follows that the specific heat of all other substances will be expressed in fractional numbers. It is this property of absorbing and giving out large quantities of heat while passing through small ranges of temperature that renders water so important an agent in modifying the rigors of climate, and so valuable an auxiliary in many pharmaceutical operations.

In passing, it may be stated that the specific heats of the elements vary inversely as their atomic weights; elements having a high atomic weight have a low specific heat, and conversely. The result of this relation is that the product of the atomic weight of an element by its specific heat is a constant quantity, 6.25 nearly, and consequently, that dividing 6.25 by the specific heat will give approximately the atomic weight. The principal use of this law is in atomic weight determinations.

Latent Heat.—We have seen that the condition of a body, whether solid, liquid or gaseous, depends to a great extent upon the quantity of heat which it has absorbed.

In the change of different substances to liquids or

vapors, or lack again, it is found that considerable quantities of heat are absorbed and given out *without corresponding changes in temperature*. For example, when a solid is exposed to a uniform source of heat its temperature continues to rise gradually until its melting point is reached. At this point, however, the temperature stops rising and remains without change until all of the solid has been liquefied, the liquid showing the same temperature as the melting solid. When the body is completely melted the temperature again begins to rise and continues until the boiling point is reached, when it again becomes stationary, and remains so until all of the liquid has boiled away, the temperature of the vapor being the same as the liquid from which it is formed.

During the time that the solid was liquefying and the liquid was vaporizing it was receiving heat at the same rate as before. If the vapor be reliquefied or if liquid be resolidified, it will be found that the same amount of heat will be given out as was absorbed during the melting or vaporization. The heat which thus disappears during the change of state to one less dense is known as Latent or Absorbed Heat, to distinguish it from sensible heat or that which expands the thermometric column.

It may be stated as a general law that bodies in passing from one state to another less dense absorb or render heat latent, and that in passing from one state to another of greater density they release or give out sensible heat.

Heat which becomes latent does not exist as such, but is expended in doing internal work upon the molecules, whereby they are kept from assuming their usual positions.

Relation of Heat to the Three States of Matter.—Every portion of matter is subject to the action of certain forces, part of which would, if unopposed, reduce it to the gaseous or radiant condition, and others of which would reduce it to absolute solidity. The factors which determine the state in which a body exists are Heat, Cohesion, and Pressure. Most elementary substances have been, probably all might be, caused to occupy each of the three states, solid, liquid, and gaseous, if subjected to the proper conditions of heat and pressure.

Expansion.—The force which tends to cause matter to assume a less dense condition is heat. When heat is caused to enter a body, increased motion is imparted to its molecules, causing them to vibrate more rapidly and to strike their neighboring molecules more violent blows. By this means the molecules are forced further apart, producing the phenomena of expansion.

If the addition of heat is continued, the range and rapidity of the molecular motion increases until the cohesive force and the external pressure which hold the body in the solid state are completely overcome, and the substance breaks down into the liquid condition. The further application of heat will occasion an expansion of the resulting liquid, and, if sufficient, may overcome the restraining forces so completely that the molecules break entirely away from the bonds of cohesion and range freely about in the state of vapor.

A notable exception to the rule that heat causes expansion is found in the case of water. This liquid has its greatest density, i. e., has the greatest weight per given volume, at the temperature 4° C. Whether the temperature rises or falls from this point the result is an increase of volume. It is for this reason that ice is lighter, bulk for bulk, than the water from which it is formed.

As a rule liquids are more expandable than solids for equal additions of heat, while gases are the most expandable of all substances.

Effects of Cohesion and Pressure.—The forces which oppose liquefaction and vaporization are cohesion and pressure.

All bodies on the earth's surface are constantly subjected to the pressure of the atmosphere. This varies between comparatively narrow limits, but the normal pressure, at the sea level, is generally taken as 1033 grams on the square centimeter, equal to the weight of a column of mercury one centimeter square and 760 millimeters high. (Usually given as the pressure of 15 pounds to the square inch, or the pressure of a column of mercury one inch in cross section and 30

inches high.) Atmospheric pressure acts in opposition to the heat energy of molecules, and tends to restrain their freedom of motion and to pack them more closely together. On the other hand, the removal of atmospheric pressure has the effect of giving the molecular motions freer range and permitting them more readily to assume the fluid condition. It is upon this principle that the vacuum and pressure apparatus of the manufacturing pharmacist depend for their efficiency in the various operations for which they are employed.

The Melting Point.—The melting or fusing point is the temperature at which a solid begins to become liquid, and at which it remains until all is liquefied. When the pressure remains unchanged a substance always melts at the same temperature. The terms melting point and freezing point are generally convertible, since a liquid usually solidifies or freezes at the same point at which it melts. Commonly, however, solidification is not spoken of as freezing unless the temperature is below the solidifying point of water.

The melting point of a substance is so characteristic that it is frequently made use of as a means of identification and a test of purity, a slight admixture of foreign material being sufficient to alter the melting point to an appreciable degree.

Effect of Pressure and Admixture on the Melting Point.—The general effect of pressure is to raise the melting point of solids, probably by aiding the internal cohesive force in holding the molecules together, and preventing that freedom of molecular motion which is always present in the liquid state. This is not the case, however, with substances which expand at the moment of solidification, such as water. In such cases the application of pressure lowers the melting point, probably by assisting the internal attractive forces to bring the molecules back into the position which they occupy in the liquid state.

The effect of the admixture of solids is frequently to lower the melting point. For example, the metallic mixtures known as alloys usually melt at temperatures below the melting points of any of their constituents. The alloy known as Rose's Fusible Metal melts at 94° C., though tin, its most fusible constituent, has a melting point when fused alone of 225° C.

The Boiling Point.—Boiling, or Ebullition, is the process of vaporization where the vapor is formed at all points throughout the liquid and not at the surface merely, and takes place only when the vapor evolved has an expansive force equal to the combined pressure of the atmosphere and the superincumbent mass of liquid. For example, a bubble forming at the bottom of a vessel of liquid must lift both the liquid above and the column of atmosphere resting on the liquid.

Under the same pressure a liquid always boils at the same temperature, and, like the melting point of a solid, the boiling point of a liquid is a valuable criterion of its purity. If the boiling point is above or below that determined for a pure substance, or changes before the liquid boils entirely away, some impurity is present.

If the barometer is not at standard height at the time of the experiment a correction must be made for the difference of pressure.

The practical methods of determining melting and boiling points will receive consideration under the head of Pharmaceutical Processes.

Effect of Pressure and Admixture on Boiling Point.—Since boiling takes place only when the pressure of the vapor is equal to the pressure upon the liquid, it follows that to increase the pressure raises the boiling point, while a decrease of pressure lowers it. By sufficient decrease of the air pressure it is possible to boil water at all temperatures between 0° C. and 100° C. It is to take advantage of this property of liquids that the vacuum apparatus is used in pharmacy.

As with the melting point, the boiling point is generally altered by admixture. In general, the boiling point of a liquid containing a dissolved substance is intermediate between that of the solvent and that of the dissolved substance. If the dissolved substance is a solid, the boiling point will be raised. If the dissolved substance is a liquid, the boiling point will lie between the boiling points of the liquids mixed. If the dissolved substance is a gas, the boiling point will always be below

that of the solvent. If two liquids which are mutually insoluble, such as water and ether, chloroform, or carbon disulphid, are mixed the boiling point of the mixed liquids will be lower than the boiling point of either constituent.

Evaporation Below the Boiling Point.—It is a familiar fact that many substances, water for example, vaporize below the boiling point. In such instances the vapor is disengaged at the surface only of the liquid, and there is no formation of bubbles within the body of the liquid. Vaporization of this kind may take place at all temperatures. Even a piece of ice will gradually vaporize and disappear, though all the time below the freezing point. As in the case of ebullition, evaporation below the boiling point is hastened by the application of heat and decrease of atmospheric pressure, and retarded by the reverse conditions. It is also affected by the amount of moisture already in the atmosphere and by the extent of surface which is exposed; the dryer the atmosphere and the greater the extent of surface exposed, the greater the rapidity of evaporation.

Effect of Heat on Gases.—Owing to the fact that many assay methods of pharmaceutical interest require the measurement of gases, it is of some importance to know the effect of heat upon gaseous volumes.

The effect of heat on a gas is to still further increase its elasticity and expansive force. A body of gas retained at constant pressure, will increase $\frac{1}{273}$ of its zero volume for each increase of 1° C. in its temperature. (By the zero volume is meant the volume which the gas would have at 0° C.)

If any quantity of gas be heated from 0° C. to 273° C., its volume will have exactly doubled. In like manner, if cooled below 0° C., it will be found to lose $\frac{1}{273}$ of its volume for every degree of decrease in temperature, and if the rate of decrease should remain uniform, (which of course it would not) at -273° C., it would have no volume whatever.

This relation of the volume of a gas to its temperature is expressed by the law of Charles, which is, that the volume of a gas at constant pressure is proportional to the absolute temperature, for if V represent the original volume, V' the final volume, T the original absolute temperature, and T' the final absolute temperature, then

$$V : V' :: T : T'$$

The fraction $\frac{1}{273}$ is sometimes expressed decimally, as .00366, and is known as the co-efficient of gaseous expansion.

Example: A volume of gas in a nitrometer measures 60 cubic centimeters when the temperature is 20° C: what would it measure at 15° C.?

The absolute temperatures are found by adding 273° to the Centigrade reading, which gives 293° for the initial and 288° for the required final absolute temperatures. The proposition then becomes,

$$60 \text{ Cc.} : V' :: 293 : 288, \text{ whence } V' = 58.97 \text{ Cc.}$$

This problem may also be worked without forming a proportion, as follows: The fall in temperature from 20° C. to 15° C., is 5 degrees. For each degree of fall the contraction would be $60 \times .00366 = 0.2196$ Cc. For five degrees the contraction would be $0.2196 \times 5 = 1.098$ Cc. 1.098 Cc. subtracted from 60 Cc. leaves 58.9 Cc. as the volume at 15° C.

If the volume of a gas is proportional to the absolute temperature, it follows that if a gas be prevented from expanding, the pressure which it exerts upon its container will also be proportional to the absolute temperature.

Since both the volume of a gas and its pressure are proportional to the absolute temperature, their product must be proportional, or as the rule is commonly stated, the product of the pressure of a gas by its volume is proportional to the absolute temperature, or $PV : P'V' :: T : T'$.

This rule of proportion enables us to determine the change which will take place in the volume of a gas when both its temperature and pressure vary. The student should remember, however, that the laws of Boyle and Charles are exact only within certain limits, and that calculations based upon them will generally vary slightly from the results obtained by careful experiment.

Production of Mass Motion by Molecular Motion.

—According to this theory the pressure of a gas is due to the heat energy of its molecules. Although the impact of a single molecule upon the walls of a vessel which contains it may be inconceivably small, it must nevertheless exert a certain quantity of force. And since a very small space may contain thousands of millions of molecules, it is easy to comprehend that the combined results of their millions of millions of impacts per second may amount to a very great pressure.

The inside of the cylinder of a steam engine must receive this bombardment of the water molecules equally on every portion, but the piston only being movable, it is pushed outward and communicates its motion to the crank to which it is attached. It is in this way that molecular motion is converted into mechanical or mass motion, or into the movement of appreciable masses.

The generation, regulation and practical applications of heat will be considered in the lectures devoted to Pharmaceutical Processes.

SENIOR COURSE. LECTURE NO. 19.

Group II. Alcoholic Preparations.—Continued.

TINCTURAE.—Tinctures.

A typical tincture is a solution of organic principles extracted from animal or vegetable substances by maceration or percolation with an alcoholic menstruum. They differ from the Spirits in that while these are solutions of volatile substances, the tinctures are solutions of both volatile and non-volatile principles, the latter predominating. In only two of the tinctures, *Tincture of Ferric Chlorid* and *Tincture of Iodine*, are the dissolved substances entirely volatile. These are both solutions of inorganic substances, and are therefore not typical tinctures, but have so long been included in this class of preparations that it has not been though advisable to change their names.

The official tinctures are seventy-two in number, and have been among the most useful and popular of preparations. They lack, however, one of the valuable features of the fluid extracts, namely, a uniform relation in the weight of drug to the volume of finished preparation, ranging from less than one-half of one per cent. to fifty per cent. of a single ingredient.

The tinctures of animal and vegetable drugs are made by bringing the alcoholic menstruum into intimate contact with the suitably comminuted substance, either by maceration or percolation, until the soluble matters are extracted. The tinctures of inorganic substances are made by dissolving the material directly in the menstruum or by diluting an official liquor with alcohol.

Three tinctures are required to show a definite alkaloidal strength when assayed by the official process. It is to be regretted that the same requirement has not been extended to other tinctures of the more active drugs, since, owing to the varying amounts of moisture contained in the air-dry drugs, and imperfections in the manufacture, many tinctures are liable to great variations in activity.

The members of this class which are prepared from animal or vegetable drugs most nearly realize the modern idea of a tincture, namely, a solution of organic principles in alcohol.

Classification of Official Tinctures.—Owing to the large number of the official tinctures, and to the numer-

ous variations in the methods of preparation. It is desirable to adopt some method of classification which will bring them into groups of a size convenient for study.

According to the nature of the materials from which which they are prepared, the tinctures may be grouped into three main divisions or sub-classes, as follows:

1. MADE FROM INORGANIC MATERIALS.
2. MADE FROM ANIMAL DRUGS.
3. MADE FROM VEGETABLE DRUGS.

SUB-CLASS 1. TINCTURES OF INORGANIC SUBSTANCES.

The members of this group are placed by themselves as hardly realizing the modern idea of the tinctures, in that their dissolved ingredients are mainly inorganic and that they are not made by maceration or percolation. They are two in number, one made by the simple admixture of alcohol and an official liquor, and the other by dissolving the medicating substance in alcohol.

Tinctura Ferri Chloridi. Tincture of Ferric Chloride.—Mix 250 Cc. Solution of Ferric Chloride with sufficient Alcohol to make 1000 Cc., and let stand for at least three months in a closely covered vessel. Preserve in glass stoppered bottles protected from the light.

The requirement that the mixture shall stand at least three months is to afford time for the production of certain ethereal compounds supposed to be formed by the reaction of the free acid on the Alcohol, and which are thought to contribute to the diuretic properties of the tincture. The direction to keep in the dark, is to prevent the reduction of the ferric to the ferrous salt which is always found in the preparation when exposed to the light.

The preparations of iron are incompatible generally with soluble hydrates and carbonates, salicylic acid, and salicylates, carbolic acid, vegetable astringents, and with mucilage of acacia.

Ferruginous tonic and diuretic. Dose 0.6 to 2. Cc., largely diluted, better administered through a glass tube as the free acid is injurious to the teeth.

Tinctura Iodii. Tincture of Iodine.—Triturate 70 Gm. Iodine in a mortar to a coarse powder, transfer to a graduated bottle, rinse the mortar with Alcohol and pour into the bottle, and add sufficient Alcohol to make 1000 Cc. Agitate occasionally until dissolved. The object of powdering the iodine is to hasten its solution.

Used externally in cutaneous affections, as an application to enlarged glands, etc.

The so-called colorless tinctures of iodine made by adding sodium thiosulfate, etc., do not contain free iodine, but an alkaline iodide and other compounds, and should not be dispensed unless expressly called for.

SUB-CLASS 2. TINCTURES OF ANIMAL DRUGS.

These are now but two in number, one prepared by percolation, and one by maceration. The menstruum of the first is alcohol, and of the second diluted alcohol.

Tinctura Cantharidis. Tincture of Cantharides.—Moisten 50 Gm Cantharides in No. 60 powder with 30 Cc. of Alcohol, pack firmly in a cylindrical percolator, and percolate until 1000 Cc. of tincture are obtained.

Much used as an ingredient in popular "hair tonics" and stimulating liniments. When employed internally its dangerously irritant and poisonous nature must be remembered. Dose 0.1 to 0.3 Cc., largely diluted.

Tinctura Muschi. Tincture of Musk.—Rub 50 Gm. Musk to a smooth mixture with 450 Cc. water, at first gradually added. Transfer to a bottle, add 450 Cc. Alcohol, and macerate for seven days with occasional shaking. Filter, and add through the filter sufficient Diluted Alcohol to make 1000 Cc.

Stimulate, antispasmodic. Dose 2.0 to 8.0 Cc.

SUB-CLASS 3. TINCTURES OF VEGETABLE DRUGS.

This sub-class includes the majority of the official tinctures, and for convenience may be divided in four Groups, as follows.

- Group A. Made from Cellular Drugs.
- Group B. Made from Non-Cellular Drugs.
- Group C. Made from Official Extracts or Tinctures.
- Group D. Made from Fresh, Undried Drugs.

GROUP A. TINCTURES OF CELLULAR DRUGS.

The method to be employed in extracting the soluble constituents of a drug depends largely upon its structure. Drugs of cellular structure permit the use of percolation, while those which do not possess such a structure generally can not be percolated. The greater number of tinctures of this group are prepared by percolation, preceded by a short period of maceration, the general formula being as follows:

Moisten the powder with the requisite amount of the proper menstruum and macerate for twenty-four hours. Pack firmly in a cylindrical percolator and pour on menstruum as required until 1000 Cc. of tincture are obtained.

In some cases the percolator is directed to be glass or to be a conical percolator, or the drug is to be packed moderately instead of firmly, and in some instances the previous maceration is shortened or entirely omitted. These and other variations from the general formula will be noted as they arise.

The menstruum employed in the various tinctures depends, of course, upon the nature of the principles to be extracted. If these are largely resinous, the official Alcohol, containing 91 per cent. by weight of absolute alcohol, is usually directed. If simple bitter or astringent principles are to be extracted, the menstruum may be alcohol and water, or alcohol and glycerin in various proportions, diluted alcohol, or diluted alcohol and glycerin.

As Group A is still too large to be easily studied as a whole, it will be convenient to divide it into smaller divisions. The more important facts which the student desires to retain concerning any tincture are the nature of its medicinal ingredients, its percentage strength, or the grams of drug represented by 100 Cc. of the finished preparation, and the character of its menstruum. These facts are accordingly made the basis of the classification given below.

The fineness of the powder employed and the exact properties of the menstrua, when the latter are other than Alcohol or Diluted Alcohol, are rarely referred to. When the knowledge of such details is necessary, the student should refer specially to the Pharmacopœia.

Unless expressly stated to the contrary, all the tinctures in Group A. are made according to the general formula previously given.

The first sub-division of Group A. is into Simple and compound tinctures, according to the number of ingredients in the formula.

Simple Tincture of Cellular Vegetable Drugs.

This sub-group embraces all the tinctures of Group A. in which a single ingredient only is employed.

Five Per Cent. Tinctures.

(a) Menstruum Alcohol and Water.

Tinctura Capsici.—Tincture of Capsicum.

(b) Percolated without prior maceration.

Tinctura Strophanthi.—Tincture of Strophanthus

Ten Per Cent. Tinctures.

(a) Menstruum Alcohol.

Tinctura Bryonice.—Tincture of Bryonia.

(b) Menstruum Alcohol and Water

Tinctura Arnice Radicis.—Tincture of Arnica Root

Tinctura Calamulæ.—Tincture of Calamula.

Tinctura Chirata.—Tincture of Chirata.

Tinctura Quassia.—Tincture of Quassia.

Tinctura Serpentaria.—Tincture of Serpentaria.

Tinctura Sumbul.—Tincture of Sumbul.

(c) Menstruum Diluted Alcohol.

Tinctura Cardamomi.—Tincture of Cardamom.

Tinctura Croci.—Tincture of Saffron.

Tinctura Matricæ.—Tincture of Matric.

(d) Menstruum Alcohol, Water and Glycerin.

Tinctura Cinnamomi.—Tincture of Cinnamon.

Percolated in conical percolator. Maceration omitted.

Fifteen Per Cent. Tinctures.

(a) Menstruum Alcohol.

Tinctura Cannabæ Indicæ.—Tincture of Indian Cannabals.

Tinctura Physostigmatæ.—Tincture of Physostigma.

(b) Menstruum Alcohol and Water.

Tinctura Colchicæ Seminis.—Tincture of Colchicum Seed.

Tinctura Gelsemii.—Tincture of Gelsemium.

Tinctura Scillæ.—Tincture of Scilla.

(c) Menstruum Diluted Alcohol.

Tinctura Belladonnæ Foliorum.—Tincture of Belladonna Leaves.

Tinctura Digitalis.—Tincture of Digitalis.

Tinctura Hyoscyamus.—Tincture of Hyoscyamus.

Tinctura Stramonii Seminis.—Tincture of Stramonium Seed.

(d) Menstruum Alcohol, Water and Acetic Acid.

Tinctura Sanguinariæ.—Tincture of Sanguinaria.

Use a glass percolator.

Twenty Per Cent. Tinctures.

(a) Menstruum Alcohol.

Tinctura Calendulæ.—Tincture of Calendula.

Tinctura Cimicifugæ.—Tincture of Cimicifuga.

Tinctura Cubebe.—Tincture of Cubeb.

Tinctura Pyrethri.—Tincture of Pyrethrum.

Tinctura Zingiberis.—Tincture of Zingiberis.

(b) Menstruum Diluted Alcohol.

Tinctura Arnice Florum.—Tincture of Arnica Flowers.

Tinctura Humuli.—Tincture of Hops.

Tinctura Hydrastis.—Tincture of Hydrastis.

Tinctura Kramerie.—Tincture of Krameria.

Tinctura Lobellæ.—Tincture of Lobelia.

Tincture of Arnica Flowers is percolated without prior maceration.

(c) Menstruum Alcohol and Water.

Tinctura Aurantii Amari.—Tincture of Bitter Orange Peel.

Tinctura Quillajæ.—Tincture of Quillaja.

Tinctura Valerianæ.—Tincture of Valerian.

The coarsely ground quillaja is boiled with 800 Cc. water for 15 minutes, strained and evaporated to 600 Cc. When cold it is mixed with alcohol, filtered and made up to 1000 Cc. by addition of water.

(d) Menstruum Alcohol and Glycerin.

Tinctura Gullæ.—Tincture of Nutgalls.

Use conical glass percolator, pack without moistening, and percolate without prior maceration.

(e) Menstruum Alcohol, Water and Glycerin.

Tinctura Cinchonæ.—Tincture of Cinchona.

Glass percolator to be used.

(f) Menstruum Aromatic Spirit of Ammonia.

Tinctura Valerianæ Ammoniatæ.—Ammoniated Tincture of Valerian.

Use glass vessels, well closed.

Thirty-Five Per Cent. Tinctures

Menstruum Alcohol and Water.

Tinctura Aconiti.—Tincture of Aconite.

Forty Per Cent. Tinctures.

Menstruum Alcohol.

Tinctura Veratri Viridis.—Tincture of Veratrum Viride.

Compound Tinctures of Cellular Vegetable Drugs.

In this list are included all of the tinctures of Group A, which have more than a single medicating ingredient, whether the adjective "compound" is used in the official title or not. The added ingredients are usually for the purpose of masking the taste or modifying the action of the principal ingredient, or both. The per cent., when given, refers to the most important or most active ingredient.

Ten Per Cent. Tinctures.

(a) Menstruum Alcohol and Water.

Tinctura Gentianæ Composita.—Compound Tincture of Gentian.

Gentian 100 Gm. Bitter Orange Peel 40 Gm. Cardamom 10 Gm. Reduce the mixed drugs to powder, and percolate by the general formula.

(b) Menstruum Alcohol, Water and Glycerin.

Tinctura Cinchonæ Composita.—Compound Tincture of Cinchona.

Mix 100 Gm. Red Cinchona, 80 Gm. Bitter Orange Peel and 20 Gm. Serpentina, reduce to powder, and prepare by the general formula.

Tinctura Rhei.—Tincture of Rhubarb.

Mix 100 Gm. Rhubarb and 20 Gm. Cardamom, and reduce to powder. Prepare by general formula.

Tinctura Rhei Dulcis.—Sweet Tincture of Rhubarb.

Mix 100 Gm. Rhubarb, 40 Gm. each of Glycyrrhiza and Anise, and 10 Gm. Cardamom and reduce to powder. Prepare by general formula.

Twenty Per Cent. Tinctures.

Menstruum Alcohol, Water and Glycerin.

Tinctura Rhei Aromatica.—Aromatic Tincture of Rhubarb.

Mix 200 Gm. Rhubarb, 40 Gm. each Cassia Cinnamon and Cloves, and 20 Gm. Nutmeg, and reduce to powder.

Tinctures Containing Aromatics and Coloring Matters Only.

Menstruum Alcohol and Water.

Tinctura Lavandulæ Composita.—Compound Tincture of Lavender.

Dissolve 5 Cc. Oil of Lavender Flowers, and 2 Cc. Oil of Rosemary in 700 Cc. Alcohol, and add 250 Cc. Water. Mix 20 Gm. Cassia Cinnamon, 5 Gm. Cloves, 10 Gm. each of Nutmeg and Red Saunders, and reduce all to No. 20 powder. Prepare by the general formula, using the solutions of oils as the first menstruum and finish with Diluted Alcohol.

Menstruum Diluted Alcohol and Glycerin.

Tinctura Cardamomi Composita.—Compound Tincture of Cardamom.

Mix 20 Gm. each Cardamom and Cassia Cinnamon with 10 Gm. Caraway and 5 Gm. Cochineal, and reduce to powder. Prepare by general formula, omitting prior maceration.

SENIOR COURSE, LECTURE No. 20.

Drug Store Advertising. — Concluded.

BY WILLIAM M. FREDENBURG.

THE SHOW WINDOW.

It is noticeable that in the above classification the show window is a medium available for all drug stores. It is possessed by all stores alike, and, aside from its practical utility for light, it might be very properly considered as one of the tangible assets of a business, upon which more or less may be realized according to the disposition and ability of the proprietor. The propriety of attaching a money value to the show window finds support in the practice of advertising by bill boards. In the larger cities considerable sums of money are expended for the privilege of posting bills in public places, and general advertisers apparently find such publicity profitable, although their wares cannot be specifically described in such locations, and often they may not be for sale in the immediate vicinity. It is safe to assume that the show window as an advertising space is worth

several hundred per cent. more than any bill board in the same vicinity. Many proprietors of drug stores, if they were so inclined, could rent their show windows for considerable sums, but while such a project would not be entertained, the thought of it may emphasize the money value of the window for advertising purposes.

At first thought the window may be regarded as an advertisement of limited "circulation," that is, it may only attract those who happen to pass along the street in front of it. But its influence may be extended far beyond such limits. Thus a druggist may, by artistic window dressing and frequent changes, gain a reputation for having things in his window worth seeing. People may have no particular reason for passing along that particular street on which the store is situated, but the anticipation of seeing something of interest in the window may impel them to go quite a distance to

gratify their curiosity. The show window also furnishes a means for attaining that great desire of most tradesmen of "getting people into the store." Ordinarily people do not care to enter a store just to gratify a curiosity to see goods. They feel that they are expected to buy something, in fact that store attendants show this to be the case by their immediate inquiries as to the wants of the customer. The show window therefore gives the public a chance to see goods which it would otherwise not see, and gives the proprietor of the store a chance to interest the public in his goods. The ideal show window is a continuous panoramic display of the goods or the business behind it. It is obvious that the display of goods should be as artistic as it is possible to make it, and in this the harmony of colors and orderly arrangement should be studied. It is not necessary that a window be crowded with goods to obtain the best effects, in fact, a most common error is that of showing too many kinds of goods, making the window a kaleidoscope of forms and confusing the mind and attention, which should be strongly concentrated upon one thing. Whatever may be the character of the display, the idea should never be lost sight of that its object is to sell goods, and this purpose should never be subordinated to mere artistic effects, novelty or sensationalism. The drug business is so full of mystery to the average outsider that great opportunity exists for making the drug store window educational. Crude drug products with appropriate explanatory placards can be occasionally displayed, and these will do much to enhance the show-window reputation of the druggist. As a rule it is best to have the display germane to the drug business, as there is danger that if it merely represents something of passing popular interest it will simply have the effect of further intensifying that interest and fail to enhance the opportunity for selling goods.

No definite suggestions can be given as to changing displays in windows. This depends upon the character of the goods, their perishable nature as regards exposure to light, the ability to keep them fresh and clean, and the judgment of the proprietor as to the length of time necessary for a reasonable portion of the public to see the display. Regarding the character of goods suitable for display, preference should be given to those specialties which the pharmacist makes himself, as these are the goods which he most strongly desires to advertise. Next in order of preference are toilet goods, sundries and novelties, and, as educational features, the display of crude drugs and the utensils and operations of the pharmacy. One of the essential arguments in every advertisement is the price of the goods, and this feature should be a strong one in the show window. In this connection the value of show cards, signs, etc., must be duly recognized and the artistic writing or printing of such material is an accomplishment which should be assiduously cultivated. Proficiency in this is within the capability of most every one, and continuous practice will show the most gratifying results, even where the beginner is sure that he does not possess particular talent in this direction.

THE NEWSPAPER.

Regarding the other mediums mentioned, each has its exclusive advocates. Generally speaking, the newspapers are accorded the highest rank. They are now looked to as a source of information, not only for happenings of the day, but for the "news" of business opportunities which their advertisements contain. This idea of business "news" in advertisements is one which should be continually in mind, and the progressive advertiser should feel it a duty to try to make the advertising columns of the papers in which he advertises compete in interest, in a certain sense, with the columns of reading matter. But, as already indicated, the newspaper is a medium available only for those drug stores which may expect customers from all the territory wherein the newspaper circulates, and this confines it to the smaller cities and towns. The prices charged for advertising include circulation to all its readers. Whether part of these may be reached at the prices for the whole is always a subject for careful figuring. Our political divisions of counties with county seats give certain prestige to county-seat papers, as the merchants

residing in such towns can count upon all the people in their county as possible customers, and it is against this advantage that the merchants and papers of surrounding towns must compete with excellence of advertising and prices for advertising space.

BOOKLETS AND CIRCULARS.

The booklet and circular must be the only available mediums for many druggists, but for those who advertise in newspapers they are most valuable adjuncts. The circular is not quite so much in favor as other forms of advertising, probably on account of its being a too common form, and also because it is the cheapest to produce and usually shows its cheapness. It is usually the kind of material that people throw away, partly on account of its uninteresting aspect and because it is not a convenient form to preserve for reference. The small booklet or pamphlet can be made more pretentious in appearance, its form is a convenience, and there is more opportunity for typographical excellence. There is undoubtedly a tendency with many druggists who employ the booklet to make it too general in its character, that is, to treat of too many subjects, with the result that a few words only can be devoted to a particular article or department of business, and the reader is confused in attempting to fix attention upon any specific thing. The best plan with such advertising is to make it specific in referring to but one or two things. Thus a booklet of four or eight pages devoted to the prescription department, or one devoted exclusively to the druggist's specialties or his perfume department or paints is likely to be more effective than one which contains but brief references to all these things. The booklet should be regarded as an advertising opportunity to say all that should be said about a particular thing. It should contain the whole argument in favor of that particular thing and it should tell the whole story.

WRITING THE ADVERTISEMENT.

After the mediums and advertising space have been determined upon, which will give the opportunity to reach a certain number of people, the responsibility for making the advertising profitable rests with the writer of the advertising. While a poor advertisement or a stereotyped "card" is of some value, the advertiser should regard his space in much the same light as a store room for which rent is paid—both have to be well filled to be profitable. The duty of keeping the advertising space well filled with interesting matter is just as imperative as keeping the store open every day for business. The advertising space is really one of the salesmen and should earn its salary and be kept busy.

The advantage of simplicity in style and honesty in statement have already been referred to. The advantage of the former is that it is the easiest, and of the latter that there is the least labor in describing things as they actually exist. Other important points to be regarded are naturalness, clearness and brevity.

Naturalness has reference to a choice of words such as an advertiser is most accustomed to employ in ordinary conversation. The easy "conversational" style, so-called to distinguish it from the more formal style which gives an impression of "bookishness," is adopted with success by many successful advertisers, and it consists essentially in saying in an advertisement just what would be said were the customer face to face. That writer is peculiarly fortunate who can imagine that the average customer is before him while he is writing, and he is doubly fortunate if he can place himself in that customer's place and view the subject of the advertisement with all the doubts which would naturally arise, and answer all the questions which a doubter or one not especially interested might ask.

Clearness in writing an advertisement means clearness from the point of view of an outsider—one who is quite ignorant of the article advertised and to a certain extent not interested in it. Many writers fail in this respect by assuming that the public already knows the details concerning the article advertised, and also through a dislike to present these in the simplest way for fear of the ridicule of competitors. For example, telling

the public that quinine is derived from a tree, or that sponges belong to the animal kingdom, seems to the pharmacist like an expression of the commonplace, and he would not make such statements if writing to or for other pharmacists, but the general public is interested in just such statements.

Brevity is one of the necessities in writing advertisements because each word represents an expense, and there is a well-established belief that people do not care to expend much time in reading advertisements. Brevity requires much practice in condensation, and this should be constantly practiced by writing all the points which can be thought of about any article, and then selecting the strongest points and expressing them as strongly as possible in the fewest words.

DISPLAY OF ADVERTISEMENTS.

As novelty of arrangement is something always desired by an advertiser, it is difficult to formulate rules for this feature of advertising. But an inspection of a majority of the advertisements published gives basis for a sort of skeleton for guidance, which may be outlined about as follows:

First, a "headline" of display type designed to attract attention; second, a description of the article; third, an argument as to its desirability; fourth, its price; fifth, information as to where it may be procured.

Pictures are extensively used to attract attention, and these, if they illustrate the articles under consideration, have the highest value. The use of deceptive headlines and the introduction of prefatory matter not germane to the subject are of doubtful value and in most cases a detriment. It is always preferable to confine the advertisement to as few subjects as possible, even if it is obvious that all the readers of an advertisement may not be interested at the time in the article advertised. If a strong impression can be made with one subject, readers will by inference grasp those general facts about a business, such as the purity of drugs, careful compounding of prescriptions and other details, which drug advertisers are constantly tempted, through habit, to place in their advertisements.

In gathering material for advertisements it is always best to pay due regard to seasonableness of goods, and in buying stock it is well to consider the inherent advertising possibilities in the goods. To this end it is desirable to keep a memorandum of those points which come to mind during the daily routine of waiting on customers, jotting down objections and commendations and noting those arguments which seem to be most effectual in selling goods. A habit of careful observance of customers in

the act of buying is a most profitable one to cultivate, and it will emphasize the statement previously made that they are interested in many little details which are uninteresting to the pharmacist because of his familiarity with them.

PREPARING "COPY."

One of the things which will make the preparation of advertising material easier is its proper arrangement for the printer. The writer of advertisements should learn to estimate the quantity of matter necessary to fill a certain space, say an inch, column wide. Then after the advertisement is written and the display lines chosen and their space carefully estimated, the "straight" or "solid" reading matter should be expanded or condensed to fit the remaining space. Advertising space should never be crowded, and one of the most valuable lessons to be learned is that of the positive value of white space around reading matter. This white space rests the eye of the reader and makes the effort of reading easier. One of the most important precepts of the printer is that which advises him to "follow copy," and it follows from this that it is quite necessary to have "copy" as perfect as possible. Punctuation and spelling should be carefully attended to, and the writer of an advertisement should make it a point to see a proof of his advertisement before it is printed to assure himself that it contains no errors and is displayed as he intended it should be.

In conclusion it may be pointed out that while advertising is a most essential factor in the conduct of business, the beginner has but little opportunity for actual practice until he becomes the proprietor of a business. He may be given opportunity to fill prescriptions and keep books under the supervision of others, but he is rarely permitted to write advertisements. Until advertising is recognized as one of the things in which an apprentice should gain proficiency, his only course is to take the initiative and study the subject on his own account. To this end the advertisements of others should be critically analyzed to discover the secret of their success. Those which are not attractive should be just as closely examined to discover their defects, and for guidance in display and arrangement advertisements which are particularly attractive should be preserved for reference. It is also a good plan to frequently practice writing advertisements simply as an educational measure, and in order that interest and enthusiasm may be maintained the literature upon the subject which appears in journals devoted to advertising and trade publications should be attentively read and studied.

NOTE TO ERA STUDENTS.—No question blank will be issued for this lecture.

ICHTHALBIN is a new compound obtained by a reaction between ichthylol and albumin. Ammonium sulphochrylate is added to a solution of albumin and then diluted sulphuric acid stirred into the mixture. A precipitate is formed, which is separated, washed, dried and powdered. To remove the repulsive odor and taste, due to presence of traces of a volatile oil, the product is either heated for 24 hours at about 120° C., or it is treated with some solvent for the oil, benzol, chloroform, etc. The compound, so prepared, is free from odor and taste, is not acted upon by the gastric juices, but is gradually absorbed by the intestines. (Ap. Ztg.)

PREPARATION OF WATER SOLUBLE ALBUMINOIDS of agreeable odor and taste, are prepared from seeds as follows: The "press-cake," the residue remaining after expression of the oil, is freed from adhering oil by means of ether or ligroin. The powdered mass is then suspended in water of 60° C. and sufficient caustic soda solution added to bring the albuminous matter into solution. The solution is filtered and evaporated to dryness *in vacuo*, whereby the sodium salts of the albuminoids are obtained as a yellow to brown powder. When ammonia is used instead of soda an excess must be taken. The albuminoids are precipitated by addition of acid, again dissolved in soda solution and this evaporated to dryness. (Ap. Ztg.)

DJAMBOE PREPARATIONS.—The leaves of *Psidia Guava*, also known as *Folia Djambœ*, are recommended

highly for acute and chronic diarrhoea. The fluid extract and vinous tincture are preferably used and may be prepared as follows: *Fluid extract*, 100 parts of the coarsely powdered leaves are moistened with a mixture of 20 parts of alcohol and 10 parts each of water and glycerin, and the mixture left standing 3 hours. It is then percolated with a menstruum consisting of 2 parts of alcohol and 1 part of water in such a manner that the first 85 parts of percolate are collected separately, the weaker portions concentrated to 15 parts and mixed with the first. The mixture is filtered and the filtrate made up to 100 parts. The product represents the drug weight for weight.—*Vinous tincture*, 1 part of finely cut leaves in macerated with 9 parts of Malaga or similar wine and 1 part of cognac for 1 week, then expressed and filtered. The filtrate is put aside for a while and just before filling into bottles filtered again, with subsequent addition of 2.5 per cent. of alcohol to prevent precipitation. This preparation is said to be an excellent substitute for the so-called cholera drops. (Ph. Post.)

DETECTION OF THE TUBERCLE BACILLUS IN MILK.—Prof. Storch proposes the following simple method: To a small quantity of the milk add a few drops of a solution of hydrogen peroxide and then a few drops of phenylene-diamine. In the absence of Koch's bacillus, no change of color in the milk will take place; if it be present, it will assume a gray-green color. (Med. Ztg.)

VEGETABLE SECRECTIONS.*

BY T. MORLEY TAYLOR.

Life may be considered to be a state of chemical and physical unrest. Sachs, in his text-book, says that the essence of life is that organized structures are capable of constant internal change in contact with water and oxygen, only such part of the chemical and physical forces being in equilibrium as is necessary to determine the form or framework of the whole. If we accept this view, then, we may define life as a perpetual state of solution and precipitation, of synthesis and analysis, of composition and resolution.

The biological unit is the living matter of the cell, protoplasm a transparent more or less viscid mass, supposed to consist of a network of extremely attenuated fibrils, saturated with a fluid containing many substances. A published analysis of protoplasm suggests something like a score of different compounds, the elements of which are carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulphur, besides some of the metals. It requires little imagination, therefore, to conceive that the great forces of nature, light and heat, plus the action of air and water, may perform a never-ending series of reactions.

If the student wades through the chapters devoted to metabolism in the various text-books published during the last ten years or so, he is likely to become so utterly muddled by the various conjectures, reiterations and contradictions as to give it up and seek relief in either, say, geometry or tobacco. One of his troubles will be the exact definition of the terms secretion and excretion. He finds these terms used synonymously and in opposition. He finds them both applied to active and also to inert matter, to useful and useless substances, whether they are collected internally or externally; an article in a well-known encyclopedia under this heading leaves nothing else of the plant to be considered after we have done with the "secretions." If we argue from analogy in the animal body, we must in the spirit of common sense define a secretion as something put aside by the organism as useful, and an excretion as something put aside as useless. Green, in his late text-book, as a matter of fact, gives us this definition, but he appears not to stick altogether to the letter of it.

We may now classify the vegetable secretions as follows:

First, substances destined to form the framework of the plant, as cellulose and its modifications. Secondly, reserve food materials such as starch, proteid and oils. Thirdly, special secretions, as unorganized ferments, chlorophyll and certain other coloring matters and substances secreted by glands or specially differentiated cells.

A vegetable cell consists of a mass of protoplasm which has secreted for its own benefit a transparent elastic membrane of cellulose, the cell wall. This secretion commences by the granulation of part of the protoplasm, the granules forming a layer gradually changing into cellulose which, in a full grown plant, is destined to play several parts, to do which it adapts itself by partial decomposition or absorption of other matters. Cellulose is insoluble in the ordinary media used in histology, alcohol, water, glycerin or in dilute alkalies and acids, but is destroyed by strong sulphuric acid and is soluble in Schweitzer's cuprammonia solution. It is stained blue by iodine after treatment with sulphuric acid. Lignified cellulose, forming the woody tissue of the plant, is insoluble in cuprammonia, but is thoroughly disintegrated by Schultz's macerating fluid. After treatment with hydrochloric acid, phloroglucin will stain it red. Cutin is formed in the outer wall of the epidermis to prevent evaporation; both it and suberin, the principal constituent of cork cells, are disintegrated by nitric acid and Schultz's fluid.

Before passing on to reserve food material, we must notice chlorophyll and its action. In the protoplasm of living cells there are formed certain granules called plastids, which take on various duties, according to their position in the plant. These are: chloroplasts, which secrete the pigment chlorophyll, and of course found in all green parts; leucoplasts, which secrete starch grains, and are found in reservoirs, such as tubers, roots and

bulbs; chromoplasts, which secrete coloring matter other than chlorophyll, such as some of the colors in petals and occasionally in some seeds; elaioplasts, or oil-forming bodies. The chloroplasts, in the presence of suitable light, suitable temperature, secrete chlorophyll, for the production of which iron is also necessary; etiolin, the pale yellow coloring-matter of plants grown in the dark, is a primary stage in the formation. Chlorophyll is the most important of the secretions, as through its intervention sugar is formed from the carbon dioxide and water taken up. It is a green pigment collected in the meshes of the chloroplasts, from which it may be dissolved out by alcohol, ether, or carbon bisulphide, but not by water, a fact which suggests that it occurs in an oily solution in the plastid. Such a solution is fluorescent, red by reflected light and green by transmitted light. The function of chlorophyll is to absorb certain rays of the light which reaches it. It therefore gives a very characteristic spectrum, and may decompose into other coloring matters of red and yellow character, to which decomposition the reds and yellows of autumn tints are due. The formation of sugar is the ultimate result of the physical action of chlorophyll, and it is to be supposed that teristic spectrum, and may decompose into other coloration, and combines with the nitrogen obtained from salts carried up from the roots to form amides of the fatty acids.

These nitrogenous and non-nitrogenous food materials are carried away to be taken up by the protoplasm at the points of growth or are transferred to various reservoirs, where they are absorbed and secreted in an insoluble form for future use.

Of course it may be argued that food under any circumstances cannot be called a secretion, but there are points of analogy between these reserve plant foods and the superfluous fat and muscle in animals which are certainly secretions, moreover, the secreted food material in plants is formed at the seat of storage by specially differentiated protoplasmic granules. The soluble sugar is here taken up by the leucoplasts and secreted in the form of starch in lamellated grains, the hilum being formed first and layer after layer poured out until the plastid is exhausted.

If the secretion remains in the mass of the protoplasm the grain will be spheroidal in shape, but if secreted externally the grains become more or less ovoid, the hilum being furthest away from the leucoplast at the end of the process.

But non-nitrogenous matter may be secreted in the form of oils and also in the form of glucosides. Oils are formed by the decomposition of the protoplasm, small drops being secreted in its mass which in time run together and fill the whole cell, or it has been observed in some seeds, that oils have been poured out like starch from special granules, and these granules have been termed elaioplasts. Glucosides may or may not be of use to the plants; those that are not must be classed with the excretions, such as resins, alkaloids, etc. Others contained in roots and seeds are certainly secreted as nutritive food material, their value in this direction being due to the glucose or other sugar produced when they are subjected to ferment action. Some of the glucosides contain nitrogen, as amygdalin, and myricin acid.

The nitrogenous reserves take the form of proteids or albuminoids, generally soluble in sodium chloride solution and precipitable by heat. They may be secreted in an amorphous form, or in the form of crystalloids, and in some particular cases in grains of a peculiarly complex formation known as aleurone grains. These aleurone grains appear to be made up of three different forms of albuminoid, the outer coat being soluble in water, the rest of the body of the grain in dilute sodium chloride solution, leaving a crystal of proteid associated with a granule of amorphous mineral matter, which proteid is soluble in a strong solution of sodium chloride. They may be demonstrated by macerating sections of the seed of *Ricinus* in a 2 per cent. solution of mercuric chloride in absolute alcohol for twenty-four hours, the alcohol removing oily matters, the mercuric chloride rendering the whole grain insoluble in water.

Leaving reserve food materials, we naturally pass on to the first class of special secretions, which are used for converting them into soluble form, easily assimilable by

* Read before the Chemists' Assistants' Association, London. (Pharm. Jour.)

the living matter of the growing embryo or shoot. These unorganized ferments occur in many forms, each having its particular substance to act upon and duty to perform. The protoplasm of the cell, amongst its many decomposition products, forms the enzymes, which are derived from zymogen secreted in its substance as a granular deposit. They are found wherever food-stuffs are stored, generally in the same cells, but often in special cells or aggregations of cells specially set apart. Such special cells in some plants develop into true glandular structures, as in the leaf surfaces of *Drosophila pinguicula*, and the pitcher plants, all of which are carnivorous. The chief of these ferments are diastase, converting starch into maltose; invertase, converting cane sugar into dextrose, emulsin and other special enzymes having the power to decompose glucosides; and the proteid digesting ferments, trypsin and pepsin. These enzymes may be extracted from the tissues by means of glycerin or sodium chloride solution.

The glands in some of the insect-catching plants appear not to act until stimulated by contact with nitrogenous matter, when a violent agitation occurs in their cells and a copious fluid, with generally an acid reaction, is poured out. Other glandular secretions are the glutinous saccharine fluid exuding from the surface of the stigma and the nectar of leaves. This nectar is called an excretion in many text-books, but it is of considerable use to the plant, and is as much a secretion as the sticky exudation from a fly's foot, the web of a spider, and the odorous secretion of the musk deer and other animals. The specialized parenchymatous cells, which secrete this saccharine fluid, occur not only in the flower, but frequently at the base of bracts, and in a few cases, in the flower stem itself. Finally, we must notice the coloring matters and odors of petals, whose object, like that of nectar, is to attract the insects, which are the essential indirect aids to reproduction. The colors are in part due to the secretion of granular plastids, similar to those which secrete chlorophyll, and in part to pigments in the cell sap of the epidermis. This completes a rough outline of the substances secreted by plants for their present or future benefit. They form in themselves a study in natural economy. Their history accentuates the greatness of the infinitely little, and is another proof that nothing in nature is despicable.

SOUND POLICIES IN BUYING GOODS.*

BY H. W. RIETZKER.

The old-fashioned apothecary would say, "Buy cheap and sell dear." Whether or not selling dear is a good business principle does not concern us at this time, but there is no doubt that *buying cheap* is an absolute necessity to the retail druggist. This at first seems like a simple question. Most all patented and proprietary goods are sold under contract, so he may think all he has to do is to send in his daily order, as there is but one price to all under this contract system. While this is true as far as contract goods are concerned, that is at present a small part of the retail druggist's business.

It is generally conceded that one can buy cheaper in his own store of traveling men than he could if in the seller's store, dealing direct with the principals. Men are out to sell, and they will sell if they possibly can; so keep in their good graces. They can serve you well if treated with the courtesy that their position entitles them to.

A good buyer must of necessity be a man possessed of a good memory; he must be thoroughly posted; he must be a man of pleasing address and genial temperament. You cannot scowl a man's price down, but you can often coax it down. What you want is to be on the same business footing that will allow you to compete with any class of merchants. To do this you must discount your bills or meet them promptly at maturity. Never make any unjust claim or attempt to deduct discounts you are not entitled to. Buy your goods in the open market from the house which gives you the lowest prices, but do not get one man's prices simply for the purpose of making some one else come down in price; this is poor policy.

We all have our preferences in regard to buying from our friends and would be glad to indulge them, providing we do not have to pay for it, but the man who pays a

little more for an article because the seller is his friend is unfit to be in business. Do not allow the blandishments of any traveling salesman or an offer of extreme dating encourage you to purchase one dollar's worth more than you may require; buy as your trade warrants, and never buy a supposed season's supply of an article at once. Do all your trading upon sound business principles. Let honor be your watchword, and by every means in your power make your account so desirable that any wholesale merchant will be glad to sell you as cheaply as he will any one. You can't have too high an appreciation of the importance of taking cash discounts upon your purchases.

On net thirty-day bills you are entitled to a cash discount of 1 per cent. in ten days; in other words, 18 per cent. per annum. Can you expect to make money any faster than that? Some wholesalers make it a point to try and sell goods on a basis of net ninety days; they carry a discount of 4 per cent. in sixty days, or, in other words, 4 per cent. for thirty days *extra time*, 48 per cent. per annum. Don't be caught on such a bait; you can't afford to do business if you have to pay 48 per cent. per annum for the privilege of thirty days *extra time*. A smaller volume of business would be profitable if kept in such limits as to make it possible to take advantage of the discounts offered. *The credit and business standing of every dealer are in proportion to the full advantage he takes of the discount privileges.* Thus you see you can buy your merchandise as advantageously as any department store if you will buy on the same terms, but you can't go to your wholesaler on the 1st of July and ask for a dating for the 1st of November or December. Pay your bills on the 10th of the following month. Your jobber is governed largely by the manner in which your account is cared for. The jobbers try to be as nearly one price as they can, but they cut their garment according to their cloth. Discount your bills, be prompt and fair, *guard your credit as you would guard your money*, and you will be able to buy just as cheaply as the largest department store on earth.

Rules for buying goods might be boiled down into two maxims: Goods are never cheap enough, provided they can be bought cheaper *without sacrifice* of the important question of quality. A good buyer hears and sees a great deal more than he tells.

PHARMACY.

DURANYL is a colorless powder obtained by the action of ozone on potato starch. It is intended as a substitute for glue and casein in the industrial arts. (Südd. Ap. Ztg.)

FORMOFORMINE is a mixture recommended for perspiration of the feet, consisting of formaldehyde 0.13 p. c., thymol 0.1 p. c., zinc oxide 34.44 p. c. and starch 65.27 p. c. It is applied as a dusting-powder. If the formaldehyde be omitted, the powder may be used also for the disinfection of purulent wounds. (L'Union Pharm.)

CEPHALINE is a proprietary medicament composed of antipyrine and powdered, roasted coffee, of each 5 parts, caffeine and sodium salicylate, of each 2 parts. The mixture is deliquescent. This preparation must not be confounded with an alkaloid bearing a similar name (cephaline) recently discovered in ipecac. (L'Union Pharm.)

AMYLENE-CHLORAL is dimethyl-ethyl-carbinol-chloral, prepared by fusing together molecular quantities of chloral and amylene hydrate. It is an oily liquid having a camphor-like odor and a burning, then cooling, taste. It is insoluble in water, but miscible to form clear solutions with alcohol, ether, fatty and ethereal oils. Recommended as a harmless hypnotic. (Südd. Ap. Ztg.)

ETCHING FLUID.—The fluorides of ammonium, potassium and sodium, barium sulphate, and sodium silicate are mixed with sufficient water to form a liquid of proper consistence for writing. The ink is applied to the glass with a gutta percha pen or a stick of lead, and is left to dry. The etching is of a chalky-white appearance. As the ink corrodes glass it must be kept in containers of gutta-percha or lead. (Südd. Ap. Ztg.)

* Read at this year's meeting of the Minnesota Pharmaceutical Association. (Bulletin of Pharmacy.)

SAGRADOL is an extract of *Cascara Sagrada* from which the bitter constituents have been removed and to which 2 per cent. of quinine has been added. (Zisch. f. Pharm.)

APTANNIN is a dirty-brown liquid used in veterinary practice, consisting, according to Dr. Aufrecht, of an infusion of herbs, mixed with 5 p. c. of glycerin and about 1.5 p. c. of formaldehyde. (Ph. Post.)

ASPIDIUM SPINOLOSUM is stated by Lauren to yield an oleoresin equally as effective as that of *A. filix* mas as a tonic and is recommended by him in cases when the rhizome of the latter plant is difficult to obtain. (Ph. Post.)

CHLORO-MONO-PHENOL is successfully used by Barbie, in Paris, for herpes tonsurans, as follows: Chloro-mono-phenol 20 parts, alcohol 80 parts and oil of lavender 10 parts. The mixture is rubbed on the affected parts once daily. (Zisch. f. Pharm.)

NAFTALAN-EMULSIONS may be prepared by two formulas recommended in Ph. Post: Naftalan, olive oil, of each 5 parts, gum arabic 7.5 parts, distilled water 110 parts. Another form is prepared by incorporating 3 parts of naftalan with 97 parts of hot olive oil.

LYSIDIN SOLUTIONS should be kept and dispensed, according to Candussio, in glass-stoppered bottles, as they are otherwise colored brown by the tannin of the corks and are partially decomposed. In absence of glass-stoppered bottles the solution may for a time be protected by covering the cork with tin-foil. (Ph. Post.)

MANUFACTURE OF BORAX.—A newly patented process consists in decomposing the native calcium borate, contained in boronatro-calcite, pandermite, etc., with sodium phosphate, sodium borate and insoluble calcium phosphate being formed. The finely powdered raw material is boiled with sodium phosphate, with or without addition of soda. The reaction is rapid and complete. The sodium borate brought into solution is separated by filtration from the calcium phosphate and is crystallized in the ordinary manner.

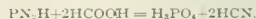
LANOFORM.—The methods of applying formaldehyde in form of ointment, dusting powder, soaps, etc., as heretofore used, have not been found entirely satisfactory, according to Wells (Ap. Ztg.), who proposes a new combination, entitled Lanoform, from which the usual disadvantages, such as unpleasant odor, variation in strength, etc., are absent. The lanoform preparations contain 1 per cent. of active formaldehyde, so combined, that it becomes effective at the temperature of the body, thus exerting its disinfecting power gradually. The preparations placed on the market are lanoform-cream and lanoform dusting-powder.

SANGUINOFORM is a new remedy proposed by Dr. Wartenburg for anemia. It is prepared from the embryonic blood-forming organs, and contains the blood corpuscles, rich in hemoglobin, in a form not yet capable of development. It is a dry, permanent powder, which has a pleasant odor and taste, due to the addition of a little cacao and peppermint. The preparation is well borne by the stomach, is readily taken by children, in whom it also stimulates the appetite. The dose for adults is a half teaspoonful three times daily and for children in proportion. (Ph. Post.)

MENTHOL FOR HEADACHE AND CORYZA.—Joussier directs the following treatment for frontal headache: A solution of 5 parts of menthol and 2 parts of rectified oil of turpentine in 100 parts of alcohol is made, a teaspoonful of this poured into a cup of hot water, and the vapors rising from it inhaled during several minutes through the nose. The procedure is to be repeated hourly. Dr. Saenger gives preference to a 10 per cent. solution of menthol for treating acute coryza, and states that it immediately relieves headache and the congestion of the nasal mucous membranes as effectively as cocaine, without the unpleasant and dangerous secondary effects of the latter. (Südd. Ap. Ztg.)

CAPARRAPI OIL is obtained from *Nectandra Caparrapi*, a tree belonging to the Laurinaceæ. It contains a monobasic acid ($C_{12}H_{22}O_2$) with the melting point $84.5^\circ C.$, also a sesqui-terpene alcohol, named caparrapilol ($C_{12}H_{22}O$), which is converted into a terpene by the abstraction of water. Distilled with steam, about 75 per cent. of the oil remains behind in resinous form. The oil is claimed to be a substitute for balsam copabia. (Ph. Post.)

NEW METHOD FOR PREPARING HYDROCYANIC ACID AND CYANIDES.—Vidal, in Paris, has patented the following process: To 60 parts of phospham (PN_3H) heated in an oilbath to 150° – $200^\circ C.$, 48 parts of formic acid are slowly added, when the following reaction takes place:



The hydrocyanic acid gas is washed and conducted into a solution of caustic or carbonated alkali, whereby a cyanide of a very high degree of purity may be obtained. If instead of formic acid its higher homologues are taken, ethereal cyanides are formed, methyl cyanide from acetic acid, ethyl cyanide from propionic acid, etc. (Südd. Ap. Ztg.)

ANTISEPTIC AND THERAPEUTIC ACTION OF ALKALI SILICATES.—Accordingly to J. Felix the beneficial effects of the so-called indifferent thermal springs are dug not alone to the high degree of heat, but to a great extent also to the presence of considerable amounts of silicates, which are of particular value in affections of the bladder (inflammation, gravel, etc.). Experimental observations have shown a 2 per cent. aqueous solution of alkali silicates to have the same therapeutic effect as the natural mineral waters. In view of the antiseptic action and nontoxic properties of these salts Felix regards it advisable to make further experiments with them as to their value for the preservation of foodstuffs, beverages, etc., also as a substitute for corrosive sublimate solution, which is injurious to surgical instruments, and for carbolic acid, which has also its disadvantages. (Ap. Ztg.)

APPLICATION OF PYROGALLOL IN SKIN DISEASES.—Pyrogallol, though much used in dermatology, has the disadvantage that its preparations (solutions, ointments, etc.), rapidly blacken through the absorption of oxygen from the air. Prof. Unna, of Hamburg, has found the following mixture to be entirely free from the inconvenience, and in every way suitable for application to the skin. It consists of 1 part of pyrogallol, 2 parts of Canada balsam and 17 parts of collodion. This forms a transparent, colorless and flexible varnish upon the skin, which may be readily removed with a little alcohol or a mixture of alcohol and ether. This varnish, which does not darken on exposure to air, has also the advantage of being an excellent vehicle for oxide of zinc. It is not, however, adapted for chrysarobin, nor for the oxides of mercury, which are rapidly decomposed. (Union Pharm.)

DECOMPOSITION OF CHLOROFORM BY THE GAS FLAME.—Dr. Schumburg has made extended experiments on this subject and summarizes the results as follows: Chloroform vapors, on coming in contact with a gaslight, form phosgene, or carbon oxychloride, which exerts a locally irritant action on the mucous membranes. Taken up by the blood this product is decomposed into hydrochloric acid and carbon monoxide, which latter is then the cause of death. The formation of phosgene takes place particularly, when the gas flames are not very high above the source of the chloroform vapors. When the flames are situated higher, the danger is smaller, as the tendency of chloroform vapors to rise is only slight. It is, however, preferable in all cases to substitute electrical illumination for gas, if this is not possible, to use the so-called sunburner, instead of the open gas flame. The products of combustion, including the phosgene, are thus completely removed. If it be necessary to use open flames, these should be placed as high as possible above the operating table and the loss in illumination be compensated for by an increased number of flames and by reflectors. (Hf. Rdschau, through Ap. Ztg.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Chameleon Mineral.

(Magician) "Chameleon Mineral" may be made by mixing one part of manganese dioxide with 3 parts of potassium nitrate. Powder finely, mix, and place in a small crucible, which must be kept at a red heat, in a common fire, for 20 minutes; then allow the mixture to cool. To use place a small quantity (10 grains) in each of two glasses; pour cold water into one, and the liquid will be a mass first green, then, in a few moments, purple, then red. Fill the second glass with moderately hot water when the liquid will become a beautiful violet, changing into crimson. The colors will be of greater or lesser intensity in proportion to the quantity of powder used; and in the course of the changing of colors, the various intermediate shades will be observed. The compound should be kept in a small wide-mouthed bottle.

Roach Exterminators.

(A. R. H.) A number of formulas for preparations of this character may be found in the June 30, 1898, issue of this journal, page 987. In the extermination or keeping away of roaches, care should be taken that all water or moisture be excluded from their usual hiding places. If this can be done, a mixture of equal parts of powdered borax, powdered quassia, and best insect powder will usually accomplish the object. The cupboards and places may also be painted with a strong decoction of quassia or with shellac varnish in which picric acid has been dissolved. The shellac varnish for this purpose is said to be best made with a solution of borax. It should also be brushed into all the joints and cracks of the wood work. We cannot give the formula for the proprietary article you name.

Quinine Sulphate and Thymol.

(H. P. T.) Quinine sulphate and thymol form a liquid oily mass when triturated together in a mortar. A similar reaction takes place when the alkaloid quinine is triturated with thymol. According to the U. S. Pharmacopœia, thymol also liquefies when triturated with about equal quantities of camphor, menthol or chloral hydrate. The exact nature of many of these changes is not so very well understood, though the fact that such liquefaction does occur is well known. Besides the substances named above thymol gives a liquid or soft mass with the following (Ruddiman): Acetamid, acetanilid, antipyrine, borneol, monobromated camphor, carbolic acid, chloral alcoholate, euphorin, exalgin, pyrocatechin, resin, salol, or eurethane. It is said also to liquefy with butyl chloral hydrate. Thymol, like most of the phenols, is capable of forming salts, ethers, etc.

Deborner or Horn Killer.

(A. S.) There are several kinds of so-called chemical "deborners," but nearly all contain potash in concentrated solution. The solution is thoroughly rubbed over the "button" of the horn in the young calf. Some time ago an agricultural exchange published the following method: "As soon as the buds of the horn appear and can be found on the calf, take a stick of caustic potash, and after moistening the horn with a little water, rub the exposed horn with the end of the stick of potash. This stick, being about the size of a lead pencil is very convenient to use, and can be slipped into a bottle for preservation, where it must be kept closely corked until again wanted. It takes but a single application to kill the young horns, and is painless." The various agricultural experiment stations throughout the country have published considerable literature upon the subject of de-

horning cattle, as has the Agricultural Department at Washington.

Indelible Ink for Rubber Stamps.

(Subscriber) The ordinary stamping ink made by diluting printing ink (which is made of lampblack and linseed varnish) with boiled linseed oil, stands pretty well if enough is used, but when poorly stamped will wash off. Dr. W. Reissig, of Munich, (Lehner, "Manufacture of Inks") has recently made an ink for cancelling stamps which is totally indelible, and the least trace of it can be detected chemically. It consists of 16 parts of boiled linseed oil varnish, 6 parts of the finest lampblack, and 2 to 5 parts of iron perchloride. Diluted with $\frac{1}{4}$ the quantity of boiled oil varnish it can be used for a stamp. Of course it can only be used with rubber stamps, for metallic type would be destroyed by the chlorine in the ink. To avoid this, the perchloride of iron may be dissolved in absolute alcohol, and enough pulverized metallic iron added to reduce it to the protochloride which is rapidly dried and added to the ink. Instead of the chloride, other salts of iron can be used. The iron unites with the cellulose and the sizing of the paper, so that it can easily be detected even after the ink has all been washed off. Ammonium sulphide is well adapted for its detection.

Phenamine.

(A. S.) Phenamine is the title given by Lindhorst to phenocol. The name phenocol is a contraction of phenetidin (parra-amidophenetol) and glyocol (amido-acetic acid), the two bodies which by interaction produce the new substance. It is closely allied to phenacetin, its formula being $C_8H_9, OC_2H_5, NH, COCH_2NH_2 + H_2O$. It is usually prepared by acting on paraphenetidin with monochloroacetylchloride, and then converting the newly-formed oxyethyl-monochloroacetanilid into phenocol by means of ammonia; the base is freed from combination by sodium hydroxide and purified by recrystallization from hot water; it readily neutralizes acids to form salts. In reality "phenamine" is a misnomer, since phenocol is not an amine, but contains an amide group. Phenocol hydrochloride is the salt usually employed in practical medicine. It occurs in the form of a white microcrystalline powder, soluble in 16 parts of water (Coblenz, "New Remedies"); it crystallizes from hot water in cubes, from hot alcohol in needles. It is employed as an antipyretic, antirheumatic and antineuralgic in doses of 0.3 to 1 gram (5 to 15 grains). It may be obtained through almost any jobbing druggist.

Artificial Cream for the Soda Fountain.

(H. L. H.) A preparation to be served from a charged fountain may be one of the following formulas from Hiss' "Manual of Beverages":

(1) Vanilla extract	2	fl. ounces
Caramel	1	av. ounce
Tincture of quillaia	15	fl. ounces
Gelatin solution	1	gallon
Syrup	1	gallon
Water	5	gallons

Introduce this mixture into a 10-gallon fountain and charge with carbonic acid gas to 90, 100, or 125 pounds (usually 100). The gelatin solution consists of Cox's gelatin, 3 ounces, and water, 1 gallon. The caramel may be omitted.

(2) Cox's gelatin	2½	boxes
Whites of 10 eggs, ...		
Syrup	½	gallon
Orange essence	1	fl. ounce
Water	9½	gallons

Dissolve the gelatin in some of the water by the aid of heat, beat the egg-white thoroughly, add to the gelatin, add the syrup and extract, introduce this mixture and the remainder of the water into the fountain, and charge as before.

(3) Gum arabic	2½	av. pounds
Sugar	7	av. pounds

Or

Syrup	1	gallon
Benzoic acid	90	grains
Water	5	pints

Dissolve the gum and water in the acid by agitation, strain and add the remaining ingredients, introduce into a fountain, add enough water to make 10 gallons, and charge as before. Any of the above preparations can be made up with sufficient water to dissolve gum, gelatin, sugar, etc., and be ready for use as required. When

needed the mixture may be introduced into a fountain, enough water added, and the whole charged. Such mixture may be known as "Whipped Cream Syrup."

Cough Cure.

(W. D. Co.) We cannot give the formulas for the proprietary preparations. The National Formulary offers several formulas for cough remedies which may be manufactured and sold under any special name you wish to give them as, for instance, compound syrup of white pine or compound syrup of Irish moss. A combination of syrups of tar and wild cherry is much used as a general cough remedy. Here are some formulas:

(1) Syrup tar	64	fl. ounces
Syrup wild cherry	45	fl. ounces
Syrup squill	16	fl. ounces
Deodorized tincture opium	4	fl. ounces
Fluid extract lobelia	6	fl. drams
Fluid extract ipecac	4	fl. drams
(2) Syrup tar	13	fl. ounces
Syrup wild cherry	13	fl. ounces
Syrup squill	50	fl. ounces
Syrup senega	16	fl. ounces
Ammonium chloride	6	fl. ounces
Morphine sulphate	3/4	av. ounces
Tartar emetic	30	grains
Water	20	fl. ounces
Glycerin	10	fl. ounces

Dissolve the ammonium chloride, morphine sulphate, and tartar emetic in the water, filter the solution, and add the other ingredients.

(3) Pine tar	1 1/2	tr. ounces
Sugar, granulated	24	tr. ounces
Diluted alcohol	18	fl. ounces
Oil anise	20	minims
Chloroform	1 1/2	fl. ounces
Fluid extract wild cherry	2 1/2	fl. ounces
Fluid extract ipecac	1	fl. ounce
Simple syrup		
Syrup glucose, of each		Sufficient.

Triturate the tar with the sugar, add the alcohol, then enough of equal parts of syrup and syrupy glucose to make 66 fluid ounces; add the remaining ingredients, let stand for several hours and strain.

(1) Morphine hydrochlorate	3	grains
Muriatic acid	2	minims
Fluid extract henbane	2	drams
Fluid extract ginger	3	drams
Fluid extract wild cherry	3	drams
Diluted alcohol	1	dram
Chloroform	1	dram
Essence of peppermint	30	minims
Syrup tar	3	ounces
Simple syrup to make	8	ounces

A great number of formulas for cough syrups have been published in previous volumes of this journal. Consult the indexes. The Era Formulary also may be profitably consulted. We do not answer queries by mail.

Waterproofing Canvas or Cloth.

(E. R. L.) The following formulas have been recommended:

(1) Linseed oil, boiled	3	gallons
Spirits turpentine	3	pints
Patent driers	3	ounces
Powdered sulphur	1	ounce
Yellow ochre (or other pigment)	4	q. s.

(2)—Grind 96 pounds of English ochre with boiled oil, and add to it 16 pounds of black paint. Dissolve 1 pound yellow soap in 1 pail of water on the fire, and mix it, while hot, with the paint. Lay this composition, without wetting it, upon the canvas as stiff as conveniently can be done with the brush, so as to form a smooth surface; the next day, or the day after (if the latter so much the better), lay on a second coat of ochre and black, with a very little, if any, soap; allow this coat a day to dry, and then finish the canvass with black paint.

(3)—A solution containing equal parts by weight of gelatine and chrome alum. It is not advisable to mix more of the solution at once than is sufficient to give the canvas one coat, as, if the mixture once sets, it cannot be reliquified like a plain solution of gelatine, and hence, if the quantity of the canvas to be waterproofed is but small, it would, perhaps, be preferable to coat with plain gelatine solution until quite impervious to cold water, and then to thoroughly soak for, say, twenty-four hours in a strong solution of chrome alum.

(4) Sodium carbonate	1	pound
Caustic lime	1	pound
Water	24	pints

Boil together, let it stand to settle, then draw off the clear lye and add to it 1 pound tallow, 1/2 pound resin, previously melted together. Boil and stir occasionally for half an hour, then introduce 3 ounces glue (previously softened), 3 ounces linseed oil and continue the boiling and stirring for another half hour. In waterproofing, 1/2 ounce of this soap is mixed with 1 gallon hot water, and in this the goods are soaked for about twenty-four hours, according to thickness and character. The pieces are allowed to drain until partly dried, then soaked for six hours or more in a solution prepared as follows:

Aluminum sulphate	1	pound
Lead acetate	1/2	pound
Water	8	gallons

Shake together, allow to settle, and draw off the clear liquid. Wring out after rinsing and dry at a temperature of 80 F.

Peanut and Peanut Oil.

(S. T. O.) The earth nut, ground nut, goober, pindar, or peanut (*arachis hypogaea*) as it is variously called, is a low, somewhat creeping annual belonging to the bean family. It is a native of the tropics, but has been for a long time cultivated very extensively in Africa, India, the West Indies, and warmer portions of America. Only the lowest flowers bear fruit, and after blooming these flowers lengthen their stems, which penetrate the ground several inches, where the fruit ripens. The fruit is 2 or 3 cm. long and 1 to 1.5 cm. thick, with a furrowed, yellowish pod, which contains from one to four seeds, one or two being the common number. In addition to their general use for food and confectionery the seeds furnish 38 to 50 per cent. of oil. The first cold pressing yields an almost colorless oil of pleasant taste and smell, which is said to be excellent for table use. After the first pressing the seeds are sprinkled with water and pressed again, cold, to obtain the oil, which is also used to some extent for food purposes, but mostly for illumination. The third oil is extracted by warm pressure, and is in great demand for making various kinds of soaps. The cake or residue is considered an excellent food for stock. The peanuts grown in tropical countries are said to yield a much greater per cent. of oil than those raised in temperate regions. In the United States peanuts are usually planted after corn, two bushels of seed being used to the acre. Planting takes place as soon as all danger from frost is past. It is said that a warm sandy loam containing some lime is the best soil for peanuts. The crop is variously stated to be from 80 to 120 bushels an acre. The oil is chiefly extracted at Marseilles, France, which annually imports millions of pounds of peanuts. In this country peanuts are used principally for eating. In other countries they are not esteemed so highly as food, hence nearly all the foreign product is used for oil. According to the latest Year-Book (1897) issued by the Department of Agriculture, the imports of "peanuts and other ground nuts," which at one time constituted an important item, valued at \$194,387 in 1864, have fallen to \$2,106.85 in 1897, while the imports of the shelled nuts have fallen from 1,104,018 pounds, valued at \$34,401 in 1872, to 1,000 pounds, valued at \$9.14 in 1897. These decreases are due to the increased domestic production. From the same authority we learn that under the name of "peanut meal" a material has been sold consisting of ground peanut hulls or shells, and even less valuable as a food than cottonseed hulls. As peanut meal, which consists of the kernel of the peanut from which the fat has been partially extracted, is one of the richest eating stuffs for stock, containing over 47 per cent. of protein, the use of the name was clearly fraudulent. "Peanut feed," which appeared to be the peanut shells finely ground, with a small mixture of inferior nuts, was found at the Massachusetts Agricultural Experiment Station to be only 32 per cent. digestible, and to contain over 50 per cent. of woody fibre. Considerable information regarding peanut oil and its use in pharmacy and the arts may be found in a paper by Prof. S. P. Sadtler, of Philadelphia, in this journal, September 23, 1907, page 416. Chemically, peanut oil is distinguished from the other oils of the olive group in containing the glycerides of two of the higher fatty acids of the saturated series, namely, arachidic acid and lignoceric acid, along with the oleic acid of the unsaturated series.

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Phar.D.
Virgil Coblentz, A.M., Ph.D.
Wilber G. Compher, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heebner, Phm.B., Ph.G.
George B. Kaufman, B.Sc., Phar.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G., Ph.D.
Edward Kremers, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.
CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison.
Oscar Oldberg, Phar.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M., M.D.
Henry H. Rusby, Ph.D.
Samuel P. Sadtler, Ph.D.
L. E. Sayre, B.Sc., Ph.M.
Wilbur L. Scoville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wullig, Ph.G., Phm.D.

JUNIOR COURSE. LECTURE No. 23.

Inorganic Chemistry.

Phosphorus.—Continued. Arsenic.

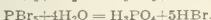
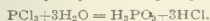
Hydrogen Compounds of Phosphorus.—Phosphorus forms three compounds with hydrogen, PH_3 , P_2H_4 , and P_3H_2 .

Phosphin, PH_3 , when pure is a colorless gas, possessing an odor like rotten fish. It is commonly prepared by heating yellow phosphorus with milk of lime or solution of caustic potash, and as obtained in this manner, is spontaneously inflammable on contact with air, owing to the presence of the liquid P_2H_4 , which is also generated by the same reaction. The mixture, when permitted to escape in bubbles into the air, bursts into flame, forming ring-like clouds of phosphorus pentoxide, which rise with a peculiar vortex motion. (Fig. 36.) The gas may also be ignited by heat, friction, sudden expansion, etc. Phosphin is also obtained when calcium phosphid is decomposed by water or acids.

Phosphin possesses feeble basic powers and is capable of uniting with negative elements to form salts known as the phosphonium compounds, as PH_4I , PH_4Br , etc. The gas is irrepressible and highly poisonous.

The liquid, P_2H_4 , and the solid, P_3H_2 , are of still less interest and importance.

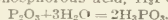
Halogen Compounds.—With the halogens, phosphorus forms a number of interesting tri- and pentahalides, as PCl_3 , PCl_5 , PI_3 , PF_5 , etc., which find their principal use as reagents in organic chemistry. They are all decomposed in the presence of water, yielding a halogen acid, and either phosphorus or phosphoric acid:



Oxygen Compounds.—Phosphorus forms four, possibly a greater number of, oxids, but only two are deserving of consideration here. Phosphorous oxid, or the trioxid, P_2O_3 , is formed by the slow oxidation of the element, especially in the presence of water. Phosphoric oxid, or the pentoxid, P_2O_5 , is formed by the further oxidation of the trioxid, or by the combustion of phosphorus in the air.

These oxids are known respectively as phosphorous and phosphoric anhydrid, because of their forming the corresponding acids when dissolved in water.

Oxygen Acids.—When phosphorous anhydrid dissolves in water phosphorous acid, H_3PO_3 , is formed.



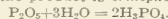
When sufficiently concentrated, the acid is a colorless, syrupy liquid, which on cooling forms a white, crystalline mass.

Only two atoms of the hydrogen of this acid can, under ordinary circumstances, be replaced by a metal, and hence its common salts are either primary or secondary phosphites, as NaH_2PO_3 , and Na_2HPO_3 , but not the tertiary phosphite, Na_3PO_3 .

When phosphoric anhydrid dissolves in water the particular acid formed depends upon the number of water molecules taken up. When the proportions are one molecule of the oxid to one of water, the product is *metaphosphoric acid*, HPO_3 .



When three molecules of water are combined with one of the anhydrid, the product is *orthophosphoric acid*.



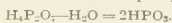
This is the common phosphoric acid of chemistry and medicine. It is a colorless, syrupy liquid, and may form either primary, secondary or tertiary salts, as NaH_2PO_4 , Na_2HPO_4 , or Na_3PO_4 . The secondary salt, di-sodium phosphate, is used as a laboratory reagent and as a medicine.

When orthophosphoric acid is exposed to a sufficiently high temperature, it loses water and forms *pyrophosphoric acid*, $\text{H}_2\text{P}_2\text{O}_7$.



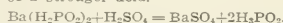
The salts corresponding to this acid are termed pyrophosphates, as $\text{Na}_2\text{P}_2\text{O}_7$, etc.

If pyrophosphoric acid be heated to a red heat, it loses still more water, and becomes *metaphosphoric acid*.



Metaphosphoric is commonly known as glacial phosphoric acid, and is seen in the form of a colorless, crystalline mass. In watery solution it is slowly reconverted into the ortho acid, more rapidly by boiling. It is distinguished from the ortho and pyro acids by its property of precipitating albumin from solution.

Hypophosphorous Acid, H_3PO_2 , has no corresponding oxid. It is formed by decomposing a hypophosphite by means of a stronger acid.



The acid is monobasic, i. e., only one hydrogen atom can be replaced by a metal, as in NaH_2PO_2 , $\text{Ca}(\text{H}_2\text{PO}_2)_2$, etc. Hypophosphorous acid and its salts are powerful reducing agents, precipitating gold, mercury and silver from their salts, and decolorizing solutions of the perman-ganates.

Hypophosphorous acid and its salts are powerful re-

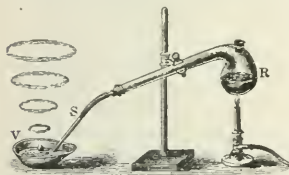
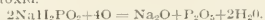


Fig. 36.—Spontaneous Combustion of Phosphin.

in the presence of an alkali. When heated in air or in the presence of oxygen they take fire and burn, or may even decompose explosively, the phosphorus being oxidized to the pentoxide.



ARSENIC.

Symbol As. Valence, 3, 5. Atomic Weight, 74.4. Specific Gravity, 4.71 to 5.72.

Historical.—The native sulfides of arsenic, orpiment and realgar, have been known since very ancient times. The trioxid was known to Geber and the later alchemists, who made use of it in their attempts at transmutation of the metals. Albertus Magnus seems to have been the first to describe a method of obtaining the element by the reduction of the trioxid with organic matter.

The English name is from the Latin *arsenicum*, derived from the Greek *arsenikon*.

Natural Occurrence.—The element occurs native in the crystalline form, or as kidney-shaped masses. It is found in combination with sulfur as the trisulfid or orpiment, As_2S_3 , and as the disulfid or realgar, As_2S_2 . It also occurs in combination with iron, nickel, cobalt and other metals, as arsenides, and is almost universally present in pyrites and other iron ores and in earths containing such ores. It is present also in sea water, in numerous mineral waters, and in many other inorganic substances.

Preparation.—The free element may be obtained by heating arsenical pyrites in the absence of air and condensing the vaporized arsenic, or by heating any arsenous compound with carbon, as powdered charcoal. In the presence of air the vapor will combine with oxygen to form the trioxid.

Physical Characters.—Elemental arsenic is steel gray, with a metallic luster, resembling white cast-iron in appearance. It exists in two allotropic modifications, one of which is amorphous and the other crystalline. The specific gravity of the amorphous variety is 4.71 and of the crystalline 5.76. It can be melted under pressure, but when heated without pressure volatilizes directly without liquefying. Its vapor has a lemon yellow color and a disagreeable, garlic-like odor. At a low red heat the density of the vapor indicates the presence of four atoms in the molecule, or that the molecular formula is As_4 . As the temperature rises these molecules split up, and at a white heat the density corresponds to the molecule As_2 .

Arsenic and all of its soluble combinations are powerful poisons, both to the animal and vegetable economy.

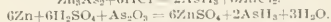
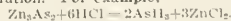
Chemical Properties.—Arsenic occupies the dividing line between the metals and non-metals. In its physical characteristics it approaches the metals very closely, having the luster of the latter and being a fairly good conductor of heat and electricity, while in nearly all of its chemical combinations it acts as a negative element or acid radical, and in this respect resembles the non-metals.

The element is tolerably permanent in dry air, but in moist air becomes covered with a coating of oxid. Heated on charcoal, compounds of arsenic are first reduced to the elemental state, the free element then combining with oxygen to form the trioxid, which rises in the form of a white cloud.

Compounds of Arsenic.

Hydrogen Compounds.—Arsenic combines with hydrogen to form a gaseous compound, AsH_3 , AsH_2 , and a solid compound having the composition As_2H_2 . The first only is of sufficient interest to deserve consideration.

AsH_3 , or gaseous hydrogen arsenid, is produced when an arsenid is acted upon by hydrochloric acid, or whenever nascent hydrogen is released in the presence of arsenic in solution. For example:

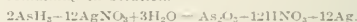


Arsin has a peculiar odor, and is intensely poisonous; a single bubble allowed to enter the nostril is said to be sufficient to cause death. A stream of the gas when ignited in the air burns with a pale blue flame, and produces a white cloud of arsenic trioxid. If a cold piece of porcelain is held in the flame, metallic arsenic is deposited as a shining mirror. This is the simplest form of the celebrated "Marsh's test" for arsenic, and

is of such delicacy that $\frac{1}{7000}$ grain can be detected with certainty.

If a tube through which arsin be passing is heated at any point, a mirror of reduced metal will be deposited in the cooler portions of the tube.

When passed into a solution of a silver salt the gas is decomposed, with precipitation of the silver, the arsenous acid remaining in solution.



Halogen Compounds.—With each of the halogens arsenic combines to form compounds of one atom of arsenic to three of the halogen. These are the trifluorid, AsF_3 trichlorid, AsCl_3 , tribromid, AsBr_3 , and tri-iodid, AsI_3 . The last named is official as *Arsenic Iodidum*, and is employed in the preparation of Donovan's Solution. A pentafluorid, AsF_5 , has been prepared by the electrolysis of the trifluorid. The existence of other pentahalids, as the pentiodid and pentbromid, is doubtful.

Oxygen Compounds.—Arsenic forms two acid-forming oxids, the trioxid, As_2O_3 , (or As_2O_5) and the pentoxid As_2O_5 .

The first, or trioxid, is obtained whenever arsenical pyrites or other arsenic-bearing compounds are roasted in contact with air, passing off as a white cloud which may be condensed in suitable chambers. It is included in the U. S. P. under the title of *Acidum Arsenicum*, a title obviously incorrect, as it is an anhydrid and not an acid.

As usually found in the shops it is in form of a heavy, fine white powder. The solid arsenous acid exists either in the form of transparent, glass-like masses which are soluble in 30 parts of cold water, or in the opaque, porcelain-like lumps, which require 80 parts of cold water for solution. The transparent variety gradually changes into the opaque form on standing. Both varieties are soluble in 15 parts of boiling water. Arsenous acid is also soluble in glycerin, turpentine, hydrochloric acid, and in solutions of the alkaline carbonates and hydroxids. The aqueous solution is supposed to contain arsenous acid, H_3AsO_3 , though this acid cannot be obtained in the free state.

Arsenous oxid, or "white arsenic," as it is frequently called, is odorless and tasteless. These qualities, together with its absence of color, render it peculiarly liable to be used as a poison, either through accident or with criminal intent. It is, however, one of the most easily detected poisons, and can be found in the tissues even after years have elapsed.

The most efficient antidote for arsenical poisoning is freshly precipitated ferric hydroxid, prepared by adding a solution of a ferric salt to diluted ammonium hydrate, and washing the precipitate free from the excess of ammonia and ammonium salts. Instead of ammonia water, calcined magnesia may be mixed with the ferric solution until a soft magma is formed. This may be administered without previous washing.

The ferric hydroxid operates by combining with the arsenical compound to form a sparingly soluble basic ferric arsenite or ferrous arsenate. The antidote should be given in liberal quantities, and the treatment continued by the administration of emetics to remove the compound of arsenic and iron from the stomach.

By oxidation of the trioxid, the pentoxid is obtained, which when hydrated forms arsenic acid, H_3AsO_4 , for which there is a corresponding series of salts known as the arsenates.

PRACTICAL STUDIES.

The water in which stick phosphorus has been kept usually contains phosphorous acid in solution. Test its powers as a reducing agent by the following experiments:

(1) Add some of the liquid to a solution of mercuric chlorid, and warm. A white precipitate is mercurous chlorid.

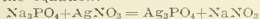
(2) Add another portion to some silver nitrate, and warm. A white precipitate is at first produced, gradually darkening and depositing metallic silver.

(3) Place a small portion of a dry hypophosphite on a platinum foil, or a small piece of tin, and heat in the flame of a Bunsen burner or alcohol lamp. What takes place?

(4) Dissolve some of the hypophosphite in water, acidulate with hydrochloric acid, and add some dilute solution of potassium permanganate. What color change occurs?

(5) Add some solution of sodium phosphate to a solution of silver nitrate, and observe the color of the precipitate.

Balance the equation:



(6) Place a small quantity of arsenous oxid on charcoal and heat with the aid of the blow-pipe. Note all the results. Is there any odor evolved? Is there an incrustation on the charcoal? Can it be driven with the blow-pipe flame?

(7) Heat the middle portion of a narrow glass tube about 15 cm long until it softens and draw the two ends apart. The result will be two tubes, each with a closed pointed end. Dry one of the tubes thoroughly by heating its entire length and introduce a mixture of equal portions of arsenous oxid and powdered charcoal, shaking carefully to the bottom. Heat the narrow portion containing the powder. Note whether an odor is evolved from the tube and whether any deposit is formed on the sides.

JUNIOR COURSE. LECTURE No. 24.

Pharmaceutical Physics.

Light.—Continued.

The Concave Spherical Mirror.—A concave spherical mirror may be regarded as a circular piece cut out of a sphere, with the reflecting surface on the inside. (Fig. 66.) For the purposes of description, we may distinguish the following parts: The distance between M and N is the *diameter*, or *aperture*, of the mirror. The point V is the *vertex*. The point C is the *center of curvature*, and represents the center of the sphere of which the mirror is supposed to be a part. The straight line drawn through C and V represents the *principal axis*. Any other straight line passing through C is known as a *secondary axis*, as CA, CB, etc.

Effect of Concave Mirrors on Light Rays.—Parallel rays, or rays coming from a great distance, as the sun, and therefore practically parallel, will be reflected to a point on the principal axis located about mid-

between the principal focus and the center of curvature. (Fig. 67.) If the object be located *between* the principal focus and center of curvature, then the image will be

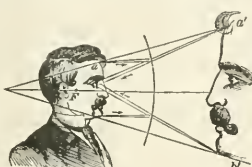


Fig. 68.—Virtual Image in Concave Mirror.

real, inverted, larger than the object and located outside of the center of curvature.

If the object be placed between the principal focus and the mirror, the image will be larger than the object, erect, and appear to be located behind the mirror. (Fig. 68.)

Effect of Convex Mirrors.—The concave mirror reversed becomes the *convex mirror*, and has a reverse effect upon the light rays. Whereas the general effect of the former is to cause a convergence, the latter causes divergence, or, the general effect of a *convex mirror* is to decrease the convergence and to increase the divergence of light rays.

Images Formed by Convex Mirrors.—If a candle be placed at PQ in front of a convex mirror, its image will appear to be located at P'Q', behind the mirror. (Fig. 69.) This will be the case, no difference how near or how

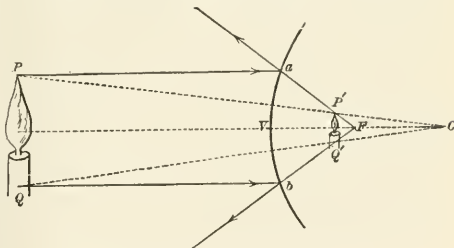


Fig. 69.—Image Formed by Convex Mirror.

far the candle be from the mirror. Hence, the images formed by a convex mirror are *virtual, erect and smaller than the object*.

Refraction of Light.—When a ray of light passes from one medium into another of different density at any angle except a right angle, its direction is changed at its entrance into the new medium. This bending or turning aside of the light rays is termed *refraction*. When the passage of the light is into a denser medium, as from air into glass or water, the direction of the refraction is toward a perpendicular to the surface which it enters. When the passage is into a less dense medium, as from glass or water into air, the refraction is away from the perpendicular to the surface which it enters.

In this connection it is to be noted that the density here referred to is *optical density*. Turpentine, which is physically less dense than water, is optically more dense and refracts light more strongly than that liquid.

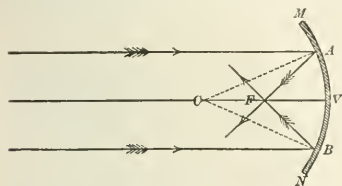


Fig. 66.—Effect of Concave Mirror on Parallel Rays.

way between the vertex and center of curvature, and known as the *principal focus*, or focus for parallel rays. (Fig. 66.) Conversely, rays originating at the principal focus, and therefore divergent when they strike the mirror, will be parallel after reflection.

If the rays originated at some other point on the principal axis, they will converge after reflection to some other focus also on the principal axis, or if they originate at the latter focus they will converge at the first named

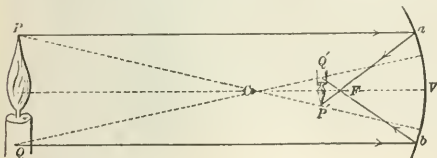


Fig. 67.—Conjugate Foci of Concave Mirror.

point. (Fig. 67.) Two such points, so related that diverging rays from one will converge and meet at the other, are known as *conjugate foci*.

From the foregoing it appears that the general effect of a concave mirror is to lessen the divergence and to increase the convergence of the light rays which fall upon it.

Formation of Images by Concave Mirrors.—The position and character of the image formed by a concave mirror depend upon the location of the object. If a candle be placed on the principal axis, *outside* of the center of curvature, a real, inverted image will be formed

The entering ray is known as the incident ray, and the angle which it makes with a perpendicular to the new medium as the angle of incidence. The bent ray is the refracted ray and the angle which it makes to the perpendicular is the angle of refraction.

Examples of Refraction.—When a stick is immersed in water the immersed portion appears to be shortened.

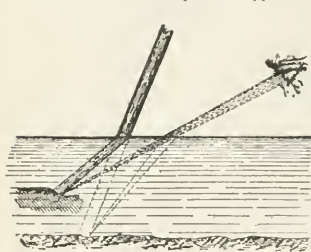


Fig. 70.—Appearance of Immersed Stick.

of the stick which on entering the air are refracted toward the water surface, and hence enter the eye as if they originated at a higher point. As an object is always seen in the direction from which it sends light to the eye, the end of the stick appears elevated above its true position.

It is in consequence of a similar refraction of the light that the water of a clear pool, viewed obliquely, does not appear to be more than about three-fourths of its actual depth.

Cause of Refraction.—The cause of refraction is the alteration in velocity which light rays undergo when they encounter a medium of different optical density than that which they have been traversing.

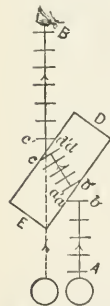


Fig. 71.—Illustrating Cause of Refraction.

In the diagram, (Fig. 71), it will be noticed that the upper side of the wave strikes the denser medium before the lower side, and is consequently the first to suffer retardation. This causes the ray to swing partly around and to take a new direction through the glass. At the opposite surface of the glass, a reverse phenomenon occurs. The upper side of the ray, which was the first to enter the glass, is now the first to leave it, and as a consequence its velocity is increased while the lower portion is still dragging along in the denser medium. The result of these two refractions is that the ray on emergence is parallel to its original direction, but displaced laterally.

When the ray enters the glass at a right angle all parts of the wave front are equally retarded, and no refraction follows.

Critical Angle and Total Reflection.—Whether a given ray of light will or will not emerge from the

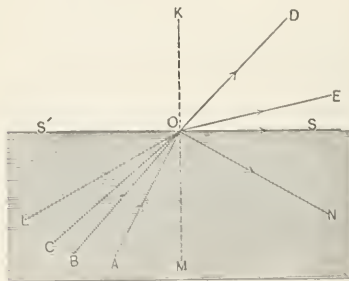


Fig. 72.—Critical Angle and Total Reflection.

medium in which it is traveling, depends upon the angle which it makes with the surface. (Fig. 72.)

If the darker portion of the cut be understood to repre-

sent a dense medium, as glass, it will be seen that as the angles of the incident rays AO and BO increase, the refracted rays rapidly approach the surface of the denser medium. The ray CO just coincides with the surface along OS, and the angle between COM is therefore known as the *critical angle*, because any ray which is incident at a greater angle than this, as the ray LO, will not pass into the atmosphere at all, but will be reflected back into the glass, along the path ON. This phenomenon, known as *total reflection*, will occur for every ray whose angle of incidence is greater than the critical angle. Toward such rays, then, the transparent surface of the glass acts as a perfect mirror.

Practical application is made of the principle of total reflection in many optical instruments, as in one form of the *camera lucida*, used with the compound microscope.

Prisms and Lenses.—Any transparent body with plane sides, two or more of which are inclined to each other, is called an *optical prism*. An example is the triangular prism previously mentioned.

Any transparent body, one of whose surfaces is curved, is called a lens.

According to their forms lenses may be divided into two classes, *convex* and *concave*. (Fig. 73.)

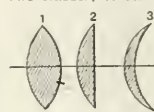


Fig. 73.—Convex and Concave Lenses in Section.

or bi-convex, with two convex surfaces. (2) Plano-convex, with one plane and one convex surface. (3) Concavo-convex, with one concave and one convex surface, and thinnest at the circumference.

A concave lens is one that is thinner at its center than at its edge, and also exists in three modifications. (4) Double-concave, or bi-concave, with two concave surfaces. (5) Plano-concave, with one plane and one concave surface, and (6) Convexo-concave, with one convex and one concave surface, and thickest at the circumference.

Like concave and convex mirrors, lenses may be regarded as representing portions of spheres, and the terms center of curvature, principal axis, etc., are used in the same way in describing their properties.

Effect of Lenses upon Light Rays.—From the law of refraction it follows that a lens will refract light rays toward its thickest portion. Hence convex lenses will cause light rays to bend toward their centers, or to converge, while concave lenses will cause them to spread outwards, or to diverge. For this reason all convex lenses are *converging lenses*, and all concave lenses are *diverging lenses*.

When parallel rays, as from the sun, are caused to pass through a convex lens they are converged to a point known as the principal focus. (Fig. 74.) That this is a real focus may be shown by its ability to set fire to a piece of paper held at this point for a short time. If the rays originate at the principal focus they are rendered parallel by passing through the lens.

If the rays originate at a luminous point outside of the



Fig. 75.—Conjugate Foci of Convex Lenses.

principal focus they will converge to another point on the opposite side of the lens. (Fig. 75.) Any two points

so located that divergent rays from one converge at the other are known as *conjugate foci*. An object placed at

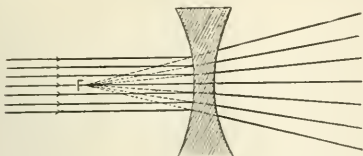


Fig. 76.—Effect of Concave Lens on Parallel Rays.

either of these foci will form a real, inverted image at the other.

Parallel rays passed through a *convex lens* become divergent on the opposite side. (Fig. 76.) The principal focus of a convex lens is a *virtual focus*, and is shown by the dotted lines of the figure.

Formation of Images by the Convex Lens.—The character and size of the image produced by a convex lens depend upon the location of the object. When this is placed outside of the principal focus the image will be located on the opposite side of the lens and will be real, inverted, and of a size proportional to its distance from the optical center of the lens. As the object is brought nearer the lens the image recedes and grows larger. When the object is brought between the lens and its principal focus, the image suddenly appears on the same side of the lens, erect and magnified.

A bi-convex lens mounted in a suitable holder and used in this manner constitutes the common pocket magnifier, or simple microscope. (Fig. 77.)

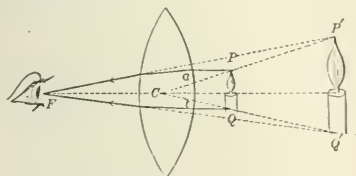


Fig. 77.—Object Within Principal Focus.

From an inspection of the figure it will be seen that the image in this case is *virtual*, as it has no real existence. The apparent enlargement is due to the change in the direction of the rays of light, so that they enter the eye at a wider angle than if the lens was not present.

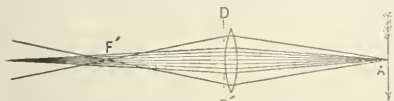


Fig. 78.—Spherical Aberration of Convex Lens.

Spherical Aberration.—The curvature of a convex lens usually corresponds to the surface of a sphere of a

radius equal to the distance between the center of curvature and the vertex of the lens. In consequence of this sphericity, the rays which strike the lens near its margin meet the surface at a greater angle than those which strike near the center, and are therefore brought more quickly to a focus on the other side. (Fig. 78.) The images formed by the central and by the marginal rays thus fall upon different planes, thereby producing a blurred effect which is known as *spherical aberration*.

Two methods of correcting spherical aberration are employed. One is by the use of a diaphragm, which is a thin sheet of metal with a central circular aperture. This is interposed between the lens and the place where the image is produced, and cuts off the images that are formed by the marginal rays. The diaphragm, of course, simply conceals the defect without removing it, and is the method of correction employed in the cheaper class of optical instruments.

Another and better method of correction is by a careful flattening or lessening of the curvature of the lens near its margin, so that both marginal and central rays are brought to a focus in the same plane. A lens thus corrected is said to be *aplanatic*.

Chromatic Aberration.—Another property of the convex lens is that it tends to act like a prism and to disperse light, or to separate it into its constituent colors by bringing the shorter rays to a focus before the longer ones. This defect is known as *chromatic aberration*, and has the effect of causing the image to be surrounded by a ring or fringe of colored light.

Chromatic aberration can also be concealed by the use of the diaphragm, but it is best corrected by taking advantage of the differences in the refractive and dispersive powers of flint and crown glass. If to the convex lens of crown glass there be cemented a plano-convex lens of flint glass, the latter will counteract the dispersion of the former, but will not be able to neutralize all of its refraction, so that the image formed is without the fringe of color. A combination of this kind is known as an *achromatic lens*.



Fig. 79.—Achromatic Lens.
(Fig. 79.)

PRACTICAL STUDIES.

- (1) If convex and concave mirrors are at hand, or if other convex and concave reflecting surfaces are available, illustrate the statements of the text as to the convergence and divergence of light, formation of images, etc.
- (2) Immerse a stick in water and observe the change in appearance when held first perpendicularly and then obliquely.
- (3) Illustrate the principle of total reflection by holding a tumbler of clear glass, half filled with water, between yourself and a lamp, and elevating the tumbler above the level of the eye until an image of the light is seen in the surface of the water.
- (4) If possible, obtain a convex lens (one can be unscrewed from an opera glass) and study the formation of images, and conjugate foci as described in the text. A simple magnifier will answer, if large enough.

SENIOR COURSE, LECTURE No. 23.

Extracta Fluida. The Fluid Extracts.

Within the meaning of the present Pharmacopœia, a *Fluid Extract* is a concentrated Alcoholic Tincture, each cubic centimeter of which represents one gram of the crude drug. The intention of a fluid extract is to transfer the valuable remedial portions of a crude drug to the fluid state with as little alteration in strength and properties as possible.

All the fluid extracts are made from cellular vegetable substances, and all by percolation. In which respects they differ from some of the tinctures. In all but two, the percolation is preceded by maceration for forty-eight hours. In *Castanea* the maceration is but two hours, and in *Triticum* the maceration is omitted.

Among the many advantages presented by the fluid extracts as a class, are the following:

- (1) The uniform relation of the volume of finished preparation to the weight of the original drug, making the dose of the fluid the same in cubic centimeters as the number of grams of the substance from which it is derived.
- (2) Their strength and permanence, both of which are obtained by the large proportion of alcohol employed in the extraction of the drug or afterwards added to the liquid.
- (3) The readiness with which they may be used as the starting point in the preparation of other liquid mixtures, as syrups and tinctures, and in the preparation of extemporaneous mixtures.

These qualities, together with the fact that the products of the leading manufacturers usually conform

fairly well to the pharmacopœial standards, have contributed to their popularity, so that at present they constitute the largest and most noteworthy class of official preparations. Eighty-eight Fluid Extracts are recognized by the present Pharmacopœia.

Preparing Tinctures from Fluid Extracts.—

Concerning the practice of preparing infusions and tinctures by the dilution of the corresponding fluid extracts, there is much difference of opinion. Perhaps it is best to say that the practice is not to be either entirely condemned nor entirely commended. Those who favor the process may claim that since a fluid extract is essentially a concentrated tincture, there can be no harm in making the weaker preparation by dilution. In favor of the process may be mentioned its quickness and convenience, and the saving of a stock of extra preparations, since the dilutions can be prepared as wanted. Against it may be alleged the danger of the fluid extract not being of the proper strength through improper manufacture or alteration by age, and thus reflecting its poor qualities upon all the mixtures made from it. The most serious danger, however, is the liability of precipitating valuable principles by the use of a diluent of different alcoholic strength than the menstruum of the fluid extract.

Our conclusion, then, is that while it may be allowable to make a tincture in this manner when the menstruum used as a diluent is the same as that of the fluid extract, the process has nothing to recommend it but convenience, and is never preferable.

Precipitates in Fluid Extracts.—While generally looked upon in the light of permanent preparations few, if any, of the fluid extracts can be kept unchanged. Nearly all, if not all, will in course of time produce precipitation upon the sides and bottoms of their containers, owing to the gradual change of certain soluble extractives into soluble forms. It is due to this fact that most manufacturers store their fluid extracts in bulk for some time before bottling. Other causes which favor precipitation are exposure to light and air, sudden alterations in temperature, loss of alcohol by evaporation, etc. To reduce or minimize these effects, the fluid extracts should be kept in small quantities, in dark, amber-colored glass ware, tightly corked, and in a cool, dark place not exposed to sudden or extreme variations in temperature. *They should not be transferred to glass-stoppered shelf ware.*

When once formed the precipitate, if inert, as is often the case, may be filtered out. If it contains the active principles of the extract and cannot be redissolved, the whole preparation should be rejected.

The Percolator.—The shape of the percolator is generally directed to be cylindrical, and the long narrow form known as Oldberg's is generally to be preferred. In three cases, however, Bitter Orange, Hamamelis and Rhubarb, the percolator is directed to be conical, the character of the drug not admitting or requiring that the menstruum traverse a long column of material.

The material of the percolator is not usually prescribed, but when the menstruum or drug contains any substance likely to react with a metal, as acids, tannin or ammonia, a glass percolator is required to be used.

Fineness of Powder and Packing.—The directions are generally to "pack firmly," but in the case of drugs which swell greatly on maceration, the injunction is to pack moderately.

In each formula the Pharmacopœia directs 1,000 grams of drug, and in all but one instance to bring the finished preparation to the final measure of 1,000 cubic centimeters. The exception is the Extract of *Nux Vomica*, which is assayed and then diluted to a fixed alkaloidal strength.

In all cases the pharmacopœial directions as to the fineness of the powder and the firmness of the packing should be followed strictly. If the powder be too fine or the packing too firm, the flow will be slow or cease altogether. If the powder is too coarse or the packing too loose, the exhaustion will be imperfect.

For further information on these points, the student should consult the lecture on percolation.

Classification of Official Fluid Extracts.—Owing to the large number and usefulness of the official fluid extracts, it is important to adopt such a scheme of

classification as will enable the student to most readily acquire and retain a special knowledge of each member of the class. The classification here adopted has kept this end in view, rather than that of logical consistency, and is founded partly upon the processes employed, partly upon the physical characters of the drugs, and partly upon the characters of the menstrua. They are first distributed into two sub-classes, A. and B.

Sub-class A includes all those which are prepared according to one general formula, or which vary only slightly from each other in their mode of preparation. Their menstrua consist of alcohol, or of alcohol and water, with or without glycerin. This division includes 78 of the 88 fluid extracts. Sub-class B includes all those for which a special formula or mode of preparation is provided.

General Formula for Fluid Extracts.—In brief, the process consists in exhausting the drug with an alcoholic menstruum, reserving the concentrated portions of the percolate, evaporating the weaker portions to the consistency of a soft extract and dissolving this in the reserve portion. The only variations in the formulas of the various members of this sub-class are in the fineness of the powders, which may vary from No. 20 to No. 60, the amount of menstruum used to moisten, and the amount of reserved percolate, which may vary from 700 to 900 cubic centimeters. With these qualifications, the general formula may be stated more fully as follows:

Moisten one thousand grams of the powdered drug with the required amount of the proper menstruum, pack in a suitable percolator, and pour on sufficient menstruum to saturate the powder and leave a stratum above. When the liquid begins to drop from the percolator, the flow is stopped, the percolator closely covered to prevent evaporation, and the mixture allowed to macerate for forty-eight hours. Percolation is then permitted to proceed, adding new menstruum as required. The first 700 to 900 cubic centimeters are set aside, and the percolation continued until the drug is exhausted. The weaker percolate is then evaporated, or the alcohol distilled off, until the residue has the consistency of a soft extract, which is dissolved in the reserved portion, and sufficient menstruum added to bring the fluid extract to a measure of 1,000 cubic centimeters.

By reserving the stronger percolate, the possible injurious action of heat is in a great measure avoided. The object of evaporating the weaker percolate to the consistency of a soft extract is to avoid the precipitation, which would occur if it were evaporated merely sufficient to make 1000 Cc., and then added to the reserved portion, owing to the fact that in the evaporation the more volatile alcohol is first given off, leaving the watery portion behind. For this reason the evaporation is continued to the soft extract stage, and the final measure made up by the addition of fresh menstruum.

When the drug contains volatile or easily decomposable constituents which might be injured by too great a temperature, the evaporation is directed to be on a water-bath at a temperature not exceeding 50° C. (122° F.).

As a further aid to the memory, the extracts of Sub-class A are here divided into smaller groups, according to the pharmacognostical character of the drug from which they are prepared, as Roots or Rhizomes, Barks, Leaves and Herbs, Stems and Branches, Inflorescences, Fruits, etc., and these groups are again sub-divided into still smaller groups according to the character of their menstrua.

SUB-CLASS A.

FLUID EXTRACTS MADE ACCORDING TO THE

GENERAL FORMULA.

Made from Roots and Rhizomes.

Menstruum Alcohol:	
Fluid Extract of Calamus.	
" " " Cimicifuga.	
" " " Gelsemium.	
" " " Iris.	
" " " Veratrum Viride.	
" " " Ginger.	
Menstruum Diluted Alcohol:	
Fluid Extract of Asclepias.	
" " " Convallaria.	

"	"	"	Cypripedium.
"	"	"	Gentian.
"	"	"	Lappa.
"	"	"	Rumex.
"	"	"	Spigelia.
"	"	"	Stillingia.
"	"	"	Taraxacum.
Menstruum Alcohol and Water in Various Proportions:			
"	"	"	Fluid Extract of Aconite.
"	"	"	" " Arnica Root.
"	"	"	" " Belladonna.
"	"	"	" " Calumba.
"	"	"	" " Colchicum Root.
"	"	"	" " Ipecac.
"	"	"	" " Leptandra.
"	"	"	" " Menispermum.
"	"	"	" " Podophyllum.
"	"	"	" " Rhubarb.
"	"	"	" " Sarsaparilla.
"	"	"	" " Squill.
"	"	"	" " Serpentaria.
"	"	"	" " Valerian.
Menstruum Alcohol, Water and Glycerin.			
"	"	"	Fluid Extract of Apocynum.
"	"	"	" " Hydrastis.
"	"	"	" " Pareira.
Menstruum Diluted Alcohol and Glycerin.			
"	"	"	Fluid Extract of Geranium.
"	"	"	" " Krameria.

Made from Leaves and Herbaceous Drugs.

Menstruum Alcohol.			
"	"	"	Fluid Extract of Buchu.
Menstruum Diluted Alcohol.			
"	"	"	Fluid Extract of Chimaphila.
"	"	"	" " Coca.
"	"	"	" " Eupatorium.
"	"	"	" " Lobelia.
"	"	"	" " Pilocarpus.
"	"	"	" " Scutellaria.
"	"	"	" " Senna.
Menstruum Alcohol and Water in Various Proportions.			
"	"	"	Fluid Extract of Chirata.
"	"	"	" " Digitalis.
"	"	"	" " Eriodictyon.
"	"	"	" " Eucalyptus.
"	"	"	" " Matico.
Menstruum Alcohol, Water and Glycerin.			
"	"	"	Fluid Extract of Hamamelis.
"	"	"	" " Uva Ursi.

Made from Bark of Stem or Root.

Menstruum Alcohol.			
"	"	"	Fluid Extract of Mezereum.
"	"	"	" " Xanthoxylon.
Menstruum Diluted Alcohol.			
"	"	"	Fluid Extract of Rhamnus Purshiana.
Menstruum Alcohol and Water.			
"	"	"	Fluid Extract of Frangula.
"	"	"	" " Viburnum Opulus.
"	"	"	" " Viburnum Prunifolium.
Menstruum Alcohol and Glycerin.			
"	"	"	Fluid Extract of Cotton Root Bark.
Menstruum Alcohol, Water and Glycerin.			
"	"	"	Fluid Extract of Aspidosperma.
"	"	"	" " Cinchona.
"	"	"	" " Wild Cherry.
"	"	"	" " Rubus.

Made from Inflorescences and Flowering Tops.

Menstruum Alcohol.			
"	"	"	Fluid Extract of Cannabida Indica.
"	"	"	" " Cusso.
"	"	"	" " Grindelia.
"	"	"	" " Lupulin. (Glands).
Menstruum Alcohol and Water.			
"	"	"	Fluid Extract of Hyoscyamus.
Menstruum Diluted Alcohol and Glycerin.			
"	"	"	Fluid Extract of Rose.

Made from Fruits and Parts of Fruits.

Menstruum Alcohol.			
"	"	"	Fluid Extract of Capsicum.
"	"	"	" " Cubeb.
Menstruum Alcohol and Water.			
"	"	"	Fluid Extract of Bitter Orange Peel.
"	"	"	" " Colchicum Seed.
"	"	"	" " Guarana.
"	"	"	" " Phytolacca.
"	"	"	" " Stramonium.
Menstruum Diluted Alcohol and Glycerin.			
"	"	"	Fluid Extract of Rhus Glabra.

Made from Twigs and Stems.

Menstruum Alcohol.			
"	"	"	Fluid Extract of Savin.
Menstruum Diluted Alcohol.			
"	"	"	Fluid Extract of Dulcamara.
"	"	"	" " Scoparius.
Menstruum Alcohol and Water.			
"	"	"	Fluid Extract of Quassia.

SENIOR COURSE, LECTURE No. 14**Materia Medica.**

BY PROF. L. E. SAYRE, B.Sc., Ph.M.

Classification of Medicines.—One can see from the above that remedial agents may be regarded from numerous points of view. Various classifications have been suggested, according as one or another phase of the drug is desired to be brought into prominence. Each classification claims for itself some special merit as to its facility in grasping the subject from its point of view. The arrangement followed by the pharmacist is not, as before stated, that of the therapist, nor is the arrangement of the therapist similar to that of the pharmacognosist, although any one of these is sufficiently inclusive. The United States Dispensatory and the Pharmacopœia abandon all ideas of scientific classification and pursue rigidly an alphabetical arrangement. The pharmacist and pharmacognosist prefer either an arrangement according to physical properties or botanical relationships.

The physician, emphasizing the therapeutical side, would naturally hold to the grouping of medicines according to their effects. As has been stated in a former paragraph, the writer has chosen an arbitrary classification for the Era students. In this arrangement there will be four classes, as follows: (1) Drugs which are comparatively inert therapeutically. (2) Drugs which are active, but not classified as powerful or potent. (3)

Potent and Toxicoidal drugs. (4) Violent poisons. This classification will have the advantage of bringing into separate groups those drugs which, from the legal point of view, should be handled with care and which give the pharmacist the greatest responsibility. The disadvantage of this classification, or rather the defect, lies in the fact that it is not considered scientific.

Before giving the minor topics of this classification, it will be well for the student to understand that in a work of this kind it will be impossible to mention every official and unofficial drug. It will be the aim of the writer to give the most important members of the different groups, thus enabling the student to go more into detail if he so desires.

GROUP I.—DRUGS WHICH ARE COMPARATIVELY INERT THERAPEUTICALLY.

- A. Sugars.
1. Saccharum (cane sugar).
2. Saccharum Uveum (glucose, grape sugar.)
3. Manna.
4. Mel (honey).
5. Syrupus fuscus (molasses).
6. Saccharum Lactis (Sugar of Milk).

B. Mucilaginous Substances.

7. Acacia (Gum Arabic).
8. Tragacantha (Tragacanth).
9. Dextrinum (Dextrine).
10. Medulla Sassafras (Sassafras pith).
11. Ulmus (Elm bark).
12. Cydonium (Quince seed).
13. Linum (Flax seed).
14. Cetraria (Iceland moss).
15. Chondrus (Irish moss).

C. Gelatinous Substances.

16. Gelatina (Gelatin).
17. Ichthyocolla (Isinglass).

D. Starchy Substances.

18. Salep.
19. Maranta (Arrow root).
20. Hordeum (Barley).
21. Corn, Rice, Potato, etc.

E. Resinous Substances.

22. Resina (Rosin).
23. Mastiche (Mastic).
24. Elastica, Caoutchouc, (India Rubber).
25. Gutta-percha.
26. Sanguis Dragonis (Dragon's blood).

F. Fatty and Oleaginous Substances.

27. Adeps (Lard).
28. Adeps Lane Hydrosus (Hydrous Wool-fat).
29. Cetaceum (Spermaceti).
30. Cera Alba (white wax).
31. Cera Flava (Yellow wax).
32. Sebum (Suet).

G. Coloring Matters.

33. Annatto.
34. Lacmus (Litmus).
35. Indigo, etc.

H. Fibrous Substances.

36. Gossypium (Cotton).

Aromatics—of this class there are many drugs, such as Aniseed, Caraway, Fennel, Coriander, etc., which are seldom considered as essential constituents of pharmaceutical preparations. They are, however, by no means therapeutically inactive or inert, in the sense in which this term has been applied, and will therefore be classified under Group II.

CLASSIFICATION OF ORGANIC DRUGS.

In the sub-division of drugs just given, it will be noticed that they are divided upon the basis of physical properties mainly.

As no uniform scheme for sub-division save that of potency is to be used in this treatment of materia medica, it is thought best to place before the student at once the names of the vegetable drugs botanically arranged. This is thought all the more important as the vegetable drugs are particularly difficult to classify.

Official Drugs Arranged under Natural Orders.

Ranunculaceæ.—Cimicifuga, Hydrastis, Pulsatilla, Staphisagria, Aconitum.
Magnoliaceæ.—Jillettum.
Menispermaceæ.—Calumba, Parelra, Menispermum.
Berberidaceæ.—Caulophyllum, Podophyllum.
Papaveraceæ.—Opium, Chelidonium, Sanguinaria.
Cruciferae.—Sinapis Alba, Sinapis Nigra, Oleum Sinapis Volatile.
Polypodiaceæ.—Krameria, Senega.
Guttiferæ.—Cambogia.
Malvaceæ.—Althaea, Gossypii Radicis Cortex, Oleum Gossypii Scintilla.
Sterculiaceæ.—Oleum Theobromatis.
Linaceæ.—Linum, Oleum Linum, Coca.
Zygophyllaceæ.—Gualiac Lignum, Gualiac Resina.
Gerraniaceæ.—Gerranium.
Rutaceæ.—Xanthoxylum, Buchu, Filocarpus, Aurantii Cortex, Oleum Aurantii Corticis, Limonis Succus, Limonis Cortex, Oleum Limonis, Oleum Bergamottæ.
Simarubaceæ.—Quassia.
Burseraceæ.—Myrrha.
Celastraceæ.—Eunonymus.
Rhamnaceæ.—Frangula, Rhamnus Purshiana.
Sapindaceæ.—Guarana.
Anacardiaceæ.—Rhus Toxicodendron, Rhus Glabra, Mastiche.
Leguminosæ.—Glycyrrhiza, Extractum Glycyrrhizæ, Hecatomylon, Santalum Rubrum, Senna, Scoparia, Cassia Fistula, Tamarindus, Physostigma, Acacia, Traga-

cantha, Catechu, Kino, Copalba, Oleum Copalba, Balsamum Peruvianum, Balsamum Tolutanum.

Rosaceæ.—Prunus Virginiana, Prunum, Amygdala Dulcis, Oleum Amygdalæ Amare, Amygdala Dulcis, Oleum Amygdalæ Expressum, Quillaia, Rosa Gallica, Rosa Centifolia, Oleum Rosæ, Rubus, Rubus Idæus, Cusso.

Hamamelidæ.—Hamamelis, Syrax.

Myrtaceæ.—Eucalyptus, Oleum Eucalypti, Caryophyllus, Oleum Caryophylli, Pimenta, Oleum Pimentæ, Oleum Cajuputi.

Lythraceæ.—Granatum.**Cucurbitaceæ.**—Bryonia, Colocynthis, Pepo.

Umbelliferae.—Anisum, Oleum Anisi, Fœniculum, Oleum Fœniculi, Conium, Carum, Oleum Carli, Coriandrum, Oleum Coriandri, Thymol, Asafœtida, Ammoniacum.

Caprifoliaceæ.—Sambucus, Viburnum Opulus, Viburnum Prunifolium.

Rubiacæ.—Ipecacuanha, Cinchona, Cinchona Rubra.**Valerianaceæ.**—Valeriana, Oleum Valerianæ.

Compositæ.—Taraxacum, Pyrethrum, Inula, Lappa, Arnica Radix, Arnica Flores, Eupatorium, Grindella, Tanacetum, Absinthium, Oleum Erigerontis, Lactucarium, Matricaria, Anthemis, Santonica, Calendula.

Lobeliaceæ.—Lobelia.**Ericaceæ.**—Uva Ursi, Oleum Gaultheriæ, Chimaphilla.**Styracæ.**—Benzoinum.**Oleaceæ.**—Manna, Oleum Olivæ.

Apocynaceæ.—Apocynum, Aspidosperma, Strophanthus.

Asclepiadaceæ.—Asclepias.**Loganiaceæ.**—Nux Vomica, Gelsemium, Spigella.**Gentianæ.**—Gentiana, Chlirata.**Hydrophyllæ.**—Erodietyon.**Convolvulaceæ.**—Jalapa, Scammonium.

Solanaceæ.—Belladonna Radix, Belladonna Folia, Stramonii Folia, Stramonii Semen, Hyoscyamus, Tabacum, Dulcamara, Capsicum.

Scrophulariaceæ.—Digitalis, Leptandra.**Pedaliaceæ.**—Oleum Sesami.

Labiatæ.—Mentha Piperita, Oleum Menthe Piperitæ, Menthol, Mentha Viridis, Oleum Menthe Viridis, Hedeoma, Oleum Hedeome, Marrubium, Melissa, Scutellaria, Salvia, Rosmarinus, Oleum Rosmarini, Oleum Lavandulæ Florum.

Chenopodiaceæ.—Chenopodium, Oleum Chenopodii.

Phytolacæ.—Phytolacæ Radix, Phytolacæ Fructus.

Polygoneæ.—Rheum, Rumex.**Aristolochiaceæ.**—Serpentaria.**Piperaceæ.**—Cubeba, Oleum Cubebæ, Piper, Matco.**Myristicæ.**—Myristica, Oleum Myristicæ, Macis.

Laurineæ.—Cinnamomum Zeylanicum, Cinnamomum Cassia, Cinnamomum Saigonicum, Sassafras, Oleum Sassafras, Sassafras Medulla, Camphora, Oleum Camphoræ.

Thymelæ.—Mezereum.**Euphorbiaceæ.**—Oleum Santali.

Euphorbiaceæ.—Stillingia, Elastica, Cascarella, Oleum Ricini, Oleum Tiglli, Kamala.

Urticæ.—Urtica, Humulus, Lupulum, Cannabis Indica, Flcus.

Juglandaceæ.—Juglans.

Cupuliferæ.—Quercus Alba, Galla, Acidum Tannicum, Acidum Gallicum, Pyrogallol, Castanea, Oleum Betule Volatile.

Coniferae.—Sabina, Oleum Sabinæ, Oleum Juniperi, Oleum Cadinum, Terebinthina, Oleum Terebinthinæ, Resina, Pix Liquida, Oleum Pice Liquide, Terebinthina Canadensis, Pix Burgundica.

Orchidæ.—Cypripedium, Vanilla.**Settaminæ.**—Zingiber, Cardamomum.**Iridæ.**—Iris, Crocus.

Liliaceæ.—Sarsaparilla, Convalaria, Veratrum Viride, Allium, Scilla, Colchici Radix, Colchici Semen, Aloe Socotrina, Aloe Barbadosis.

Aroidæ.—Calamus.**Gramineæ.**—Triticum, Saccharum, Zea, Amylum.**Lycopodiaceæ.**—Lycopodium.**Filices.**—Aspidium.**Fungi.**—Ergota.**Lichenes.**—Cetraria.

Antidotal Drugs.—Cantharis, Coccus, Ichthyocolla.

Oleum Morrhuæ, Cetaceum, Mel, Cera Flava, Cera Alba, Vitellus, Moschus, Fel Bovis Purificatum, Acidum Lacticum, Saccharum Lactis, Sevum, Adeps, Oleum Adipis, Pessinum, Pancreatinum, Adeps Lane Hydrosus.

Whenever reference is made to a vegetable drug, the student should, at once, be able to give its botanical name, and its place in the above system of classification.

Returning to the list of drugs classified as therapeutically inert, it is thought best to refer to them more in detail.

Comments on Group I.

Group I. naturally divides itself into three parts, as follows: (a) Organic non-potent drugs; (b) Inorganic non-potent drugs; (c) Aromatic Drugs.

It has been difficult to determine where to classify the last mentioned sub-division, as it seems to merge into the group following, but the author has determined to give it a place in the first group and to note its proper relations to Groups I. and II., when the sub-group is treated, see Aromatic Drugs. It should be here stated that all definitions will be those of the U. S. P.

A.—Organic Non-Potent Drugs.

Official Sugars.

Saccharum (cane sugar).—The refined sugar obtained from *Saccharum officinarum* Linné, and from various species or varieties of *Sorghum* (nat. ord. Gramineæ); also from one or more varieties of *Beta vulgaris* Linné (nat. ord. Chenopodiaceæ).

Saccharum Lactis, (sugar of milk).—A peculiar crystalline sugar obtained from the whey of cow's milk by evaporation, and purified by recrystallization.

Manna.—The concrete saccharine exudation of *Fraxinus Ornus* Linné (nat. ord. Oleaceæ).

Mel (honey).—A saccharine secretion deposited in the honey comb by *Apis mellifica* Linné (class Insecta; order Hymenoptera).

Properties and Uses.—Cane sugar, sorghum sugar and beet sugar when pure do not differ. Sugars as a class are soluble in water, but milk sugar is not freely soluble. To a certain degree they are also soluble in alcohol. They are crystalline, with the exception of Grape sugar (*Saccharum uveum*), which is regarded as non-crystalline. The latter is frequently called Glucose, although at present this term is generally applied to sugar manufactured from starch. Rock candy is an example of the pure crystallized cane sugar.

Cane sugar, as well as milk sugar, is used as a diluent of powders. The former is of importance in sweetening medicinal preparations. As a thick syrup, although fermentable, it is in a measure antiseptic, and will preserve organic extracts. We therefore have a class of preparations known as Medicinal Syrups. These are useful not only because of their permanence but also because of

their sweet taste, which facilitates the administration of nauseous medicines. Therapeutically sugars are considered as nutrients, or as food accessories. Molasses (*Syrupus Fuscus*, Treacle), is the uncrystallized residue of the refining of sugar. It is used as pill excipient for which it is well fitted.

Mucilaginous Substances.

Acacia (Gum Arabic). A gummy exudation from *Acacia Senegal* Willdenow (nat. ord. Leguminosæ).

Tragacanth. A gummy exudation from *Astragalus gummifer* Labillardiere, and from other species of *Astragalus* (nat. ord. Leguminosæ).

Sassafras Medulla (sassafras pith). The pith of *Sassafras variifolium* (Salisbury) O. Kuntze (nat. ord. Laurinæ).

Ulmus, (Elm). The inner bark of *Ulmus fulva* Michaux (nat. ord. Urticacæ).

Linum, (Lineseed). The seed of *Linum usitatissimum* (nat. ord. Linnæ).

Cetraria. From *Cetraria islandica* (Linne) Acharius (class Lichenes).

Chondrus. From *Chondrus crispus* Stackhouse, and *Gigartina mamillosa* J. Agardh (class Algae).

Properties and Uses.—The medicinal substances under section B. (mucilage yielding drugs) yield their virtues to an aqueous menstruum. A solution of gum arabic is transparent. The same is true of the mucilage of sassafras pith, but tragacanth forms with water a paste, not a solution, highly esteemed in suspending heavy insoluble powders. Both tragacanth and acacia are valuable in imparting adhesiveness to pill and lozenge masses; the latter gum, however, is preferred when consistency is desired. Irish moss and Iceland moss when boiled in water yield a solution which gelatinizes on cooling, but this treatment will coagulate mucilage of acacia. Elm bark contains a large percentage of mucilage associated with tannin. The two seeds of this group, Quince and Flaxseed, have upon their outer surface a layer of tissue loaded with mucilage, which is readily abstracted by water. The internal portion of flaxseed is saturated with fixed oil, thus there are found two distinctly medicinal substances in this seed. Dextrine, British gum, is an altered starch formed by heating the latter above 150° C. (302° F.), etc. It is an amorphous yellowish gum-like body, readily soluble in water. Solutions of many of the gums are used pharmaceutically as vehicles for anodynes and expectorants in cough mixtures and as agents for the emulsification of oils, etc. Medicinally the mucilaginous products belong to the group known as demulcents. These soften and relax the tissues, diminish the heat, tension and pain of inflamed surfaces. They are mostly nutritious; a solution of gum arabic, however, is considered to be indigestible and is purely a demulcent.

PATENTS AND COPYRIGHTS IN CHINA.

Under date of July 18, United States Minister Conger sends from Peking the following clipping from the North China News, of July 12, purporting to be a translation of a recent decree of the Emperor in regard to the enactment of copyright and patent laws.

It would appear from this decree, says Mr. Conger, that China is about to give her men of literary and inventive genius the same recognition and protection accorded them by other nations; and it is indicative of the great changes soon to take place in the country.

The following important Imperial decree, which is really the promise of the enactment of copyright and patent laws, was issued on the 4th instant.

From ancient times until now, the first duty of the government has been to bring order out of the chaos and shape the rough materials at hand. With the increasing facilities of international commerce, our country has been filled with an influx of scientific, mechanical, and artistic things which are an education to the masses, and our resources are multitudinous. Men of intellect and brilliant talent, capable of learning and doing anything they please, are not lacking; but their movements have hitherto been hampered by old prejudices which have formed a bar in thinking out and introducing to practical use new inventions. Now that we have entered upon the high road toward the education and enlightenment of the masses for the purpose of making our Empire strong and wealthy like other nations, our first duty should be the encouragement and employment of men of genius and

talent. We therefore hereby command that from henceforth, if there be any subject of ours who should write a useful book on new subjects, or who should invent any new design in machinery, or any useful work of art and science which will be of benefit to the country at large, he shall be honored and rewarded by us in order to serve as an encouragement and exhortation to others of similar genius and talent. Or if it be found that such geniuses have real ability to become officials, we will appoint them to posts as a reward, or grant them decorations or fine raiment in order to show the masses the persons who have gained honor by their talents and genius; while they shall also be allowed to enjoy the fruits of their labors by being presented with papers empowering them to be the sole manufacturers and sellers within a certain limit of time. Again, to such as have administrative talents and the necessary funds either to build schools, or begin irrigation works for the benefit of agriculture, or build rifle factories or cannon foundries, all of which will be of great benefit to the population of the Empire at large, shall be granted rewards on the same scale as men who have gained distinction in the army or navy, in order to draw upon special encouragement to work for the good of themselves and their country. We hereby further command the Tsungli Yamen to draw up the regulations which shall govern the various matters noted within this edict, and report at once to us.

HETOL is a name applied by Prof. Landlauer to sodium chnammate, which is recommended by him as a remedy for tuberculosis. It has no deleterious effect on the human organization, even when taken in considerable quantities. (Ph. Centr.)

SCIENTIFIC NOTES ON ESSENTIAL OILS.*

MANDARIN OIL.—This oil was known to contain much limonene and little citral. Messrs. Flatau and Labbe recently have submitted the oil to a close examination, and have found it to consist of 98 per cent. of limonene, traces of citral and of 1 per cent. of the same ester, insoluble in alcohol, as is contained in sweet orange oil.

CAPARRAPI OIL. is obtained from a *Laurina*, *Nectandra Cupyrapi* in a similar manner as oil of copaba, and has been in use quite a time in Columbia. The domestic name of the tree is "canelo," probably on account of the cinnamon-like odor of its bark. The oil is used in place of balsam of copaba. The color of the commercial oil is more or less dark, in consequence of the heat applied for the removal of water admixed with the oil; otherwise the oil would be almost colorless. It contains a monobasic acid, $C_{12}H_{22}O_2$, which can only be obtained from the light-colored oil in crystals, melting at $54.5^{\circ}C$. The oil devoid of this acid consists largely of a sesquiterpene alcohol, $C_{20}H_{38}O$, called caparrapiol. By dehydrating agents this is readily converted into a hydrocarbon caparrapene, $C_{20}H_{36}$. Both this and the alcohol are easily polymerized, particularly under the action of heat, so that about two-thirds of the oil used remain behind in a resinoid condition when distilled with water.

EUCALYPTUS OIL.—Messrs. R. T. Baker and H. G. Smith, of the Technological Museum at Sydney, have reported on a new Australian eucalyptus oil derived from *Eucalyptus punctata* D. C. (*Eucalyptus tereticornis* Sm. var. *bracteopurpurea*), called Grey gum. The tree also furnishes gum kino and a very hard wood. It grows in the entire coast district of New South Wales, from Queensland to the borders of Victoria. The oil was obtained from the leaves and young twigs, and represents the yield of nine distillations of material obtained from various localities. The yield of oil ranged between 0.63 and 1.19 per cent., its specific gravity between 0.9122 and 0.9205 at 17° . Two of the oils were levogyrate, the other seven dextrogyrate. An average sample of the various distillates had a sp. gr. of 0.915 at 16° ; percentage of cineol determined by the phosphoric acid method 48.4 to 64.5. The oil contains phellandrene.

MATICO OIL.—In the distillation of matico oil we have made the conclusive observation that commercial matico a mixture of leaves and spikes—is not always of uniform origin. Appearance and odor do not show any considerable differences, but the distillates do, particularly in their physical properties. These are not due to variations in the relative amount of spikes admixed with the leaves. For some time the distilled oils have failed to yield the characteristic crystallizing matico camphor. From the oil we obtained, after repeated recrystallization from petroleum ether, a solid substance melting at 62° , which proved to be asarone. Upon combining with one molecule of bromine in petroleum ether solution, the addition product asarone dibromide was obtained in crystals melting at 85° 86° . When oxidized by potassium permanganate asaric acid melting at 144° was formed, characterized by its argentic salt.

SWEET ORANGE OIL.—Professor Wallach has already shown that the oil of sweet orange consists mainly of limonene. Besides, it was known to contain some citral and a small quantity of oxygenated compound. According to recent statements of Messrs. Flatau and Labbe, myristic acid and myristol (?) are said to exist in slight quantities in the oil. Since the characteristic odor of Portugal oil is not due to the terpene alone, these investigators have entered upon a closer inquiry into the constituents of the oil, particularly the oxygenated ones. When agitating the oil with bisulfite solution they obtained a double compound, which yielded, besides traces of citronellal, a small amount of a new aldehyde with a very characteristic odor of oranges. Upon saponification a small quantity of alkali was absorbed, indicative of the presence of an acid or ester. A certain quantity of the oil was deprived of the fractions boiling below 130° under ordinary pressure and the remainder was saponified. The saponification lye, when agitated with ether, proved to contain an unsaturated fluid acid. The analysis of its salts admits the inference that it contains 21 carbon atoms to the molecule. The acid, as well as its ethylic

ester, is characterized by its slight solubility in alcohol, so that it can be separated from the oil in the form of its ester without preceding saponification by the removal of about 35 per cent. of its more volatile parts, by distillation and by subsequent addition of alcohol to the remainder. The insoluble ester separates as an amorphous powder and can be obtained in a pure state upon repeated washing with alcohol. Its melting point is 64° to 65° and its odor a strong one of oranges. Further reports about this ester may be expected.

GUAJACUM OIL.—This splendid perfume, representing the pure odor of the finest tea more strikingly than any other, still continues not to meet with due appreciation by perfumers and manufacturers of fine toilet soaps. An effort to devise a practical method for the separation of the fluid part of the oil from the solidifying one has failed. The former remains fluid at a moderately warm temperature, but solidifies upon repeated exposition to a cooler temperature. Since labor and care are unequal to the unsatisfactory results thus far attained, we have for the present discontinued the manufacture of fluid oil of guajacum until better success in overcoming the technical difficulties will have been obtained. The Bulgarian rose oil distillers have promptly recognized the value of guajacum oil. The botanical origin of guajacum wood, called "Palo balsamo" in Argentina, still remains an unsettled question, though Dr. Patzold, of the Pharmaceutical Institute of the University of Strassburg, has informed us that he has ascertained the origin of the wood beyond doubt by comparison with authentic specimens and by reliable information. The statement that the wood is derived from *Bulnesia Sarmientii* L., a tree 40 to 60 feet high, belonging to the family *Zygophyllaceae* and closely related to *Guajacum officinale* L., has proved to be a correct one. According to Grisebach, it is indigenous in the Argentine provinces of Oran and Grande-Chaco, particularly along the course of the River Rio Bermejo, a branch of the Rio Paraguay. The wood is shipped from Buenos Ayres, and has recently been thrown upon the market in quantities far exceeding the demand for its oil in perfumery. Unless some other application of the oil on a grand scale is found, the importers will have to suffer from a further excessive supply of the wood, even if the use of the oil for perfumery purposes should increase tenfold over its present consumption.

LEMON OIL.—Messrs. Umney and Swinton allege to have found a new constituent of oil of lemon. In distilling in a vacuum 2 kilos of lemon oil they obtained 300 Cc. of the fraction having the highest boiling point. In order to ascertain the amount of constituents that can be acetylated, the concentrated oil was boiled for two hours with acetic anhydride. The product of the reaction was shown to contain 68 per cent. of saponifiable constituents. It is a well-known fact that citronellal, but not citral, can be quantitatively determined by acetylation. Therefore no conclusion can be obtained thereby as to the quality of the original oil. They tried to determine the amount of aldehyde contained in the oil by means of the bisulfite method in a cassia oil flask, without, however, attaining to any approximately correct result, since the bisulfite compound of citronellal is insoluble in water and remains suspended in both the aqueous and the oily stratum, thereby preventing any distinct sight and reading of the scale. Although neither acetylation nor the determination of the amount of aldehyde affords any evidence of the quantity of aldehydes and alcohols present, the authors conclude from their experiments the presence of esters. They decomposed (apparently in the oil not yet acetylated) the aldehydes present by boiling it with alcoholic potassa solution, and subsequently submitted the product to distillation, at first in a vacuum and then under ordinary pressure. They obtained between 230° to 250° a fraction with the characteristic odor of geraniol. They isolated this alcohol by repeated fractionation. Its properties were found to approximate those of geraniol, but they omitted to specify this apparent identity; nor have the authors prepared any of the characteristic derivatives of geraniol. It, therefore, remains unsettled whether the substance obtained by Messrs. Umney and Swinton really is geraniol. Should the authors furnish supplementary evidence, the method of preparation described by them would still leave it doubtful whether the geraniol is a

* From Schimmel's Semi-Annual Report.

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Phar.D.
Virgil Cohentz, A.M., Ph.D.
Wilbur G. Compher, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Hesbner, Phm.B., Ph.G.
George B. Kauffman, B.Sc., Phar.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G., Ph.D.
Edward Kremers, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.
CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee. \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison.
Oscar Oldberg, Phar.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M., M.D.
Henry H. Rusby, M.D.
Samuel P. Sadler, Ph.D.
L. E. Sayre, B.Sc., Ph.M.
Wilbur L. Scoville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wulling, Ph.G., Phm.D.

JUNIOR COURSE. LECTURE No. 25.

Inorganic Chemistry.

Arsenic.—Continued. Antimony.

Sulfur Compounds of Arsenic.—Corresponding to the two oxids, arsenic forms two sulfids, the *trisulfid* or arsenous sulfid, As_2S_3 , and the *pentasulfid* or arsenic sulfid, As_2S_5 . It also forms a disulfid, As_2S_2 , the native form of which is known as *realgar*. The trisulfid is formed when hydrogen sulfid, or an alkaline sulfid, is added to an acidified solution of an arsenous salt. It is a bright yellow powder, soluble in alkaline hydroxids, carbonates and sulfids, from which solutions it is reprecipitated by the addition of acids. The pentasulfid is formed from the trisulfid by fusion with sulfur, or by precipitating an arsenic compound with ammonium sulfid. Its properties and solubilities resemble those of the trisulfid. The disulfid is produced by fusing together arsenic or its trioxid and sulfur, in proper proportions.

Other Arsenical Compounds.—The arsenical compounds of the shop, besides the trioxid, are usually the arsenites and arsenates of other elements, since arsenic itself exhibits only very slight basic properties. The well known *Fowler's Solution* is a preparation made by heating together arsenous oxid and potassium bicarbonate in water, and coloring the solution with compound tincture of lavender. The object of the latter is to give the solution a distinctive odor and taste, and prevent its being mistaken for a harmless substance. It contains one per cent. of arsenous oxid. The official *Solution of Arsenous Acid* consists of one per cent. of the trioxid dissolved in water with the aid of hydrochloric acid. *Donnan's Solution* is a one per cent. solution of arsenous tri-iodid, with one per cent. of red mercuric iodid. The Paris Green of the shops, much employed by agriculturists as an insecticide, is a cupric aceto-arsenite, $Cu(C_2H_3O_2)_2 \cdot 3Cu(AsO_2)_2$.

Sodium arsenate is an official compound and is preferred to most other arsenical compounds on account of its certainty of composition. A one per cent. solution is official under the title of *Liquor Sodii Arsenatis*.

Characteristic Reactions.—The reactions of arsenic are numerous and important.

Heated on charcoal with the blow pipe, white clouds of arsenous oxid are formed, with production of the odor of garlic, the latter coming not from the oxid, but from the reduced and volatilized arsenic. Mixed with charcoal and heated in a glass tube, the garlic odor is observed with production of the arsenic mirror on the colder part of the tube.

Arsenous oxid heated with dry, powdered sodium acetate evolves the offensive and poisonous arsen-dimethyl-oxid, or *cacodyl oxid*, $As_2(CH_3)_2O$.

Heated with hydrochloric acid and copper, a steel gray or bluish film is deposited on the copper. (Reinsch's Test) Antimony, Mercury and some other metals give a similar

reaction. The arsenic deposit may be distinguished from

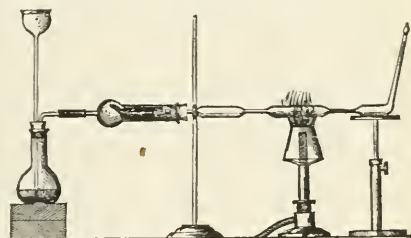


Fig. 37.—Decomposition of Arsen by Heat.

the others by the sublimate of microscopic octahedral crystals which it yields on heating.

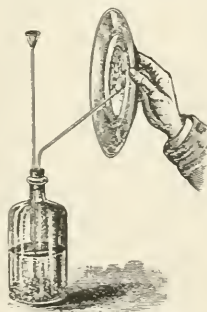


Fig. 38.—Marsh's Test for Arsenic.

solubilities similar to the arsenite.

Any compound of arsenic in the presence of nascent hydrogen evolves arsine, AsH_3 which, if passed through a heated tube, deposits a mirror of metallic arsenic on the cooler portion of the tube. (Fig. 37.) The same mirror is produced if the stream of escaping gas is ignited, and a cold piece of porcelain is held in the flame. (Fig. 38.)

Arsenites in neutral solution precipitate from silver nitrate yellow silver arsenite, Ag_3AsO_3 , soluble in ammonia and in acids. *Arsenates* precipitate from salts the dark red silver arsenate, Ag_3AsO_4 , with solu-

ANTIMONY.

Symbol, Sb. Atomic Weight, 119.52. Valence, 3, 5. Specific Gravity, 6.71–6.86.

Historical.—The trisulfid of antimony has been known since immemorial times. To the Arabs and Hebrews it was known as "Kohl," and was used by them for darken-

ing the eyebrows, a purpose for which it is still employed by the women of oriental nations. To the Greeks it was known as *stippi* or *stili*, and to the Latins as *stimm* or *stibium*.

According to Valentine, the name Stibium is of Chaldean, and the name Antimonium of Latin origin. The story that the latter name was derived from the circumstance that some monks were accidentally poisoned by its compounds, which were therefore termed "antimonie," meaning "opposed to monks," while amusing is, no doubt, apocryphal.

A method of obtaining the metal from its ore was first described by Eash Valentine in the latter part of the fifteenth century, though the free element had been known to the alchemists long prior to that time. As late, however, as the sixteenth century the metal was still confounded with bismuth.

Natural Occurrence.—The principal and most common ore of antimony is Stibnite, or the black trisulfid, Sb_2S_3 , found in various parts of both the old and new world. It is also found combined with arsenic, and in various complex compounds of antimony with sulfur, iron, copper, lead, nickel and silver. The element also occurs in the free state to a very limited extent.

Preparation.—The crude stibnite is commonly contaminated with silica and earthy impurities, from which it is freed by fusing and permitting the melted sulfid to run off from the infusible material. By roasting the sulfid in the open air the sulfur is driven off and the trioxid, Sb_2O_3 , is formed. The trioxid is then reduced to the metallic condition by heating with carbon, the latter element serving to carry off the oxygen, and the melted metal is drawn off and cast into moulds. Or the sulfid, without prior roasting, is heated with scrap iron, when the iron combines with the sulfur to form iron sulfid, leaving the antimony free. The metal as prepared by either method usually contains arsenic, iron and copper as impurities.

Physical Characters.—Antimony is a hard, silvery white metal, and possesses a brilliant luster. The cast metal when of good quality, usually exhibits brilliant, star-like markings and is hence known as "star antimony." Perfect crystals are obtuse rhombohedrons, closely resembling cubes. The specific gravity varies from 6.71 to 6.86. The fracture may be either laminar or granular, according as the cooling was slow or rapid. The brittleness of the metal enables it to be easily powdered. It fuses at 425° , and can be vaporized at a bright red heat.

Chemical Properties.—Heated in the open air before the blow-pipe it forms dense white clouds of the oxid, Sb_2O_3 , which deposit as a white incrustation on the support. It does not affect water at ordinary temperatures, but at a red heat decomposes it with evolution of hydrogen and formation of the trioxid. Cold, dilute sulfuric acid does not affect the metal; the hot concentrated acid dissolves it, forming antimony sulfate, and evolves sulfur dioxide. It is readily soluble in hydrochloric or nitrohydrochloric acid. Nitric acid oxidizes the metal, but does not dissolve it unless concentrated.

Uses of the Free Element.—Metallic antimony is used in the preparation of several important alloys, to which it imparts hardness, fusibility, and the property of expanding at the moment of solidification, thus enabling a sharp impression of the mould to be taken. Type-metal is an alloy of antimony, lead and tin; britannia, or pewter, of antimony and tin; and Babbitt, or antifriction metal, of antimony, lead, tin and copper.

Compounds of Antimony.

Hydrogen Compounds.—When hydrogen is evolved in contact with a compound of antimony it combines with the latter to form antimony hydrid, or stibin, SbH_3 , which resembles in its properties the corresponding compound of arsenic and hydrogen.

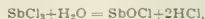
Stibin is an instable gas, possessing a disagreeable odor, and burns in the air with a grayish-white flame, forming white clouds of antimonious oxid. When a cold surface, as porcelain, is held in the flame of burning stibin, or when the gas is passed through a ret-hot tube, a brilliant mirror of metallic antimony is formed, resembling the deposits in the Marsh tests for arsenic, but usually lustrous and distinguished from the arsenic spot by its turning white, without dissolving, when treated with nitric acid.

Stibin is decomposed when passed through alkaline or acid solutions. Passed into a solution of silver nitrate, silver antimonid, $SbAg_2$, is precipitated.

Halogen Compounds.—Antimony forms one or more compounds with each of the halogens, the most important of which are its compounds with chlorine.

Antimonous chlorid or **Antimony trichlorid**, $SbCl_3$, is formed when the metal or its oxid is dissolved in hydrochloric acid, or when distilled with some volatile chlorid. It is a colorless, crystalline, very deliquescent substance. It is commonly seen in the form of an impure solution known as "liquid butter of antimony," and used as a caustic application in veterinary practice.

When an acid solution of the trichlorid is diluted with water, the compound is decomposed and part of the antimony precipitated as a basic or oxy-chlorid, the remainder being held in solution by the hydrochloric acid set free in the reaction.



The composition of the precipitate varies with the degree of dilution, temperature, etc. When it has the composition $SbOCl$ it is known as Powder of Algaroth, from its having been used as a medicine by the physician Algarothus, near the end of the sixteenth century.

Antimonic chlorid or **Antimony pentachlorid**, $SbCl_5$, is formed by the direct combination of antimony and chlorine, the union being accompanied by the evolution of light and heat. It is a colorless, volatile, fuming liquid, decomposed by heat, and, like the preceding compound, yielding basic precipitates when diluted with water.

With bromin antimony forms a tribromid, with iodin a tri-iodid, and with fluorin a tri- and pentafluorid. These resemble the chlorids in their general properties and are of but little practical importance.

Oxygen Compounds.—Antimony forms three oxids, the trioxid, Sb_2O_3 or Sb_2O_4 , the tetroxid, Sb_2O_4 , and the pentoxid, Sb_2O_5 .

Antimonous oxid, or the **trioxid**, occurs to some extent in the native state. It can be obtained artificially by roasting the sulfid in the air, by oxidizing the metal with nitric acid, or by treating the precipitated oxychlorid with an alkali to remove the remaining chlorine.

It is soluble in acids, to form the antimonous salts, and is used to some extent in medicine.

The tetroxid and pentoxid are unimportant.

Sulfur Compounds.—Antimony forms a number of compounds with sulfur, only two of which need consideration. Antimonous sulfid, Sb_2S_3 , is the principal ore of the element, and occurs in crystalline, steel-gray masses. It is this natural compound, freed from earthy impurities by fusion, which constitutes the black antimony of the shops and the *Antimonii Sulphidum* of the Pharmacopœia. When intended for internal use it is purified by digesting the fine powder with ammonia water to remove arsenic, and becomes the official *Antimonii Sulphidum Purificatum*.

The trisulfid when artificially prepared by passing hydrogen sulfid into an acidified solution of an antimonous compound is orange-red and amorphous. Both the natural and artificial forms are soluble in solutions of the alkalies and alkaline sulfids, and are reprecipitated by acids in the amorphous, orange-red condition. When a solution in an alkaline hydroxid is treated with dilute sulfuric acid, the resulting precipitate, consisting of antimonous sulfid mixed with a small amount of the oxid, constitutes the *sulfurated antimony*, or *Kermes mineral* of the Pharmacopœia. Antimonic sulfid, Sb_2S_5 , is formed in a similar way and has similar properties.

Potassium-Antimonyl Tartrate.—When antimonous oxid is boiled with a solution of potassium bitartrate, the remaining hydrogen atom of the latter is replaced by the radical Antimonyl, SbO , and potassium-antimonyl-tartrate, $KSbOC_4H_4O_6$, is formed, popularly known as Tartar Emetic.

Properties and Uses of Antimony Compounds.

—The principal uses of the antimony compounds are found in medicine, the oxid, sulfid, and tartar emetic being the compounds commonly used. In small doses they are diaphoretic and alterative, in larger doses emetic. Their poisonous action in general resembles that of arsenic, but is usually not fatal, on account of the rejection of the substance by the emesis invariably produced.

The amorphous red sulfid is used as the vulcanizing

agent in the manufacture of red or brownish red rubber goods.

Characteristic Reactions.—Many reactions of antimony resemble those of arsenic, from which it is, nevertheless, in general easily distinguished. Heated on charcoal before the blow-pipe, solid antimony compounds yield white clouds of the oxid, with a white incrustation on the charcoal, and the production of a bead of metallic antimony, but without the garlic odor produced by arsenic when similarly treated. When an antimony compound is added to a piece of bright copper foil in dilute hydrochloric acid and heated, a steel gray deposit of antimony is formed on the copper. This is distinguished from the similar deposit of arsenic by drying the foil and heating in a dry test tube, when the sublimate will be amorphous and not crystalline like that of arsenic.

Solutions of antimony compounds, not too strongly acid, will produce white precipitates of basic salt when poured slowly into a large excess of water.

Hydrogen sulfid passed into solutions of antimonous salts precipitates the orange red sulfid, soluble in alkaline hydroxids and sulfids.

PRACTICAL STUDIES.

(1) Heat one end of a glass tube about 10 cm long until the bore closes. While still hot, blow in the open end until the hot portion expands into a small bulb. Dry the tube by heating throughout, and allow to cool. Make a mixture of equal parts of arsenous oxid and dried and powdered sodium acetate and introduce into the bulb. Heat the mixture, and note any odor which may be evolved. (The evolved vapors are poisonous, and should not be inhaled.)

(2) Place a mixture of equal parts of water and hydrochloric acid in a test tube, add a strip of copper foil and heat. If the materials are free from arsenic, the surface of the foil should grow brighter. Now add a few drops of solution of potassium arsenite or any other arsenous solution and continue heating. Does the copper change color?

(3) Remove the copper, dry thoroughly, introduce it into a clean, dry test tube, and apply heat. Does a sublimate form on the walls of the tube? If so, examine with the aid of a magnifier, and determine the crystalline form.

(4) To a neutral solution of potassium or other arsenite add solution of silver nitrate. Compare the result with the next.

(5) To a neutral solution of sodium or other arsenate add silver nitrate. Compare with the last. Write the equation.

(6) Into a solution of an arsenite, or arsenous oxid, acidulated with hydrochloric acid, pass hydrogen sulfid, or add a small amount of ammonium sulfid diluted with ammonia water. Note the character of the resulting precipitate.

(7) Separate a portion of the last precipitate, add ammonium sulfid, and, if necessary, warm gently. Does it dissolve?

(8) To the last solution, add dilute HCl or H₂SO₄. What is the result?

(9) Place some dry antimonous oxid in a small cavity on charcoal and heat before the blow-pipe. Is there odor, incrustation, or metallic bead? How does the result compare with the corresponding experiment under arsenic?

(10) Dissolve some oxid of antimony in hydrochloric acid with the aid of heat, using no more acid than is necessary. What is probably formed in solution? Add a few drops of the solution to a test tube full of water. What occurs? Write an equation representing the reaction.

(11) Dilute the solution of antimonous chlorid (a precipitate, if it forms, does not interfere), and pass in hydrogen sulfid, or add a small amount of ammonium sulfid, diluted with ammonia water. What takes place? Write an equation.

(12) Pour off from the last precipitate, rinse with water, and add sufficient yellow ammonium sulfid to cover. If necessary, warm gently, and note the result.

(13) To the clear solution obtained in the last experiment add dilute sulfuric acid, drop by drop, and note the result.

(14) Place a strip of copper foil in a test tube with some dilute hydrochloric acid and heat. If arsenic is absent, the foil should become bright. Now add a few drops of any solution containing antimony and continue the heating. Compare the result with the corresponding experiment under arsenic.

JUNIOR COURSE. LECTURE No. 26.

Pharmaceutical Physics.

Light.—Continued.

Double Refraction and Polarization of Light.—If a transparent piece of the mineral known as Iceland Spar be placed over a word, the letters will appear double.



Fig. 80.—Double Refraction by Iceland Spar.

(Fig. 80). If the crystal be rotated, the letters of one set will be seen to rotate around the others. This phenomenon is known as *double refraction*, and will occur for every position in which the crystal may be placed except one. When the object is looked at along one

diameter of the crystal, known as the *optic axis*, double refraction does not occur. A plane which contains the optic axis is known as a *principal plane*, and a section made along this plane, as a *principal section*.

The light on entering a double refracting substance is divided into two parts, one of which, termed the *ordinary ray*, is refracted in the usual manner; the other, termed the *extraordinary ray*, is not.

When light which has passed through Iceland spar is examined by appropriate means, it is found to have acquired a new set of properties. It is now capable of reflection in certain directions only, and of penetrating many transparent substances in some directions, but not in others, and, in short, acts as if it had acquired definite sides and vibrated only in certain planes. Light in this condition is said to be *polarized* or *plane polarized*.

This condition can be produced by the transmission of ordinary light through numerous transparent substances besides Iceland spar, and by reflection from certain polished surfaces.

The Nicol Prism.—One of the most efficient methods

for polarizing light, or of recognizing it after it is polarized in the *Nicol prism*. This consists of a rhomb of Iceland spar which has been cut diagonally, or along the principal plane, and the two pieces cemented together again by Canada balsam. (Fig. 81.) When a beam of light is admitted in the direction of the arrows of the figure, it is doubly refracted, as previously described. The ordinary ray strikes the balsam surface at an angle greater than the critical angle, and is hence reflected to one side and out of the crystal, while the extraordinary ray strikes the balsam at less than its critical angle and consequently passes through. The Nicol prism thus enables us to get a beam of light polarized in one plane.

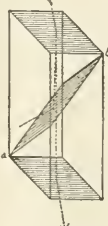


Fig. 81.—Nicol Prism.

The Polaroscope.—If the polarized ray from one Nicol prism be admitted to a second Nicol it will pass through, provided the latter be so placed that its principal plane is parallel to the principal plane of the first, but if the

second prism be rotated through one quarter of a circle so that their principal planes are not parallel, the ray will be quenched and no light will pass through.

When two Nicol prisms are used together in this manner, the first is called a polarizer and the second an analyzer. Such an arrangement constitutes a *polariscope*.

Theory of the Polariscope.—It is believed that a ray of ordinary light vibrates in every direction across its path of propagation, so that if we could see the end of an advancing wave for a sufficiently brief period it would present an appearance something like Figure 82. After its polarization by Iceland Spar it would present an appearance like a Figure 83, the ray now vibrating in two planes only, and these at right angles to each other. By means of the total reflection of the layer of balsam in the Nicol, one of these planes is gotten rid of, and the transmitted light now vibrates in one direction only. This ray will pass through a second



Fig. 82.—Imaginary Cross Section of Light Rays.



Fig. 83.—Ideal View of Polarized Light.

Upon this theory the two Nicol prisms may be compared to that of two open gratings. (Fig. 83.) When the openings are parallel, the light will be transmitted, when these openings are crossed, it will be shut out.

The Organ of Vision and Its Relation to Light.

The Eye.—The eye consists essentially of a closed, nearly spherical chamber, containing an arrangement of convex lenses and refractive media by means of which

images are projected upon a delicate screen upon a delicate screen of nervous filaments located on the inner back wall of the chamber. (Fig. 84.) Beginning with the outermost coat we may distinguish the following different tissues: The *sclerotic*, (2), or "white of the eye," which in front is modified to form a circular, transparent portion, the *cornea*, (1). Lining the sclerotic is the *choroid*, (3), a tissue saturated

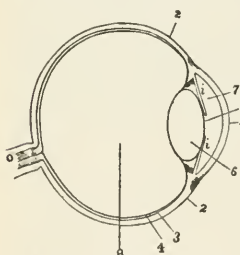


Fig. 84.—Diagrammatic Cross Section of the Eye.

with a dark pigment, to prevent internal reflection. Covering the choroid in the posterior portion of the eye is the *retina*, (4), an exceedingly delicate tissue consisting of an expansion of the optic nerve, (5). Underneath the cornea is a small chamber filled with a limpid liquid, the *aqueous humor*, (7). Back of the aqueous humor lies the *iris*, (6), a continuation of the choroid, and constituting the colored portion of the eye. In the center of the iris is a circular opening, the *pupil*, (3). By the contraction or expansion of the iris the pupil narrows or enlarges, and regulates the amount of light admitted. Under the iris is seen the *crystalline lens*, (6), a bi-convex lens of tough, elastic and transparent material. Underneath the crystalline lens and filling the main body of the eye is the *vitreous humor*, (8), a transparent, jelly-like substance.

The light rays coming from an object are refracted by the curved surface of the cornea, crystalline lens, and the two humors, which all together act like a single bi-convex lens, and project an inverted image upon the retina which lines the posterior portion of the eye.

Microscopically the retina is found to consist of ten different layers, made up of nerve fibers, cells, granules and pigment. In some way, not at present understood, possibly partly by chemical and partly by physical means, the light rays forming the retinal image originate nervous impulses in the nerve elements of this tissue, and these are transmitted along the optic nerve to the optic centers, where they give rise to the sensation of sight.

Some Common Defects of the Eye.—In the normally constituted eye the curvature of the crystalline lens is

altered by unconscious muscular contraction to accommodate the eye either for near or distant objects, and to cast a sharply defined image upon the retina. (A. Fig. 85).

In some eyes the diameter from front to rear is so great that this muscular contraction is not sufficient and the rays of light are brought to a focus some distance in front of the retina instead of upon it. (B. Fig. 85). This

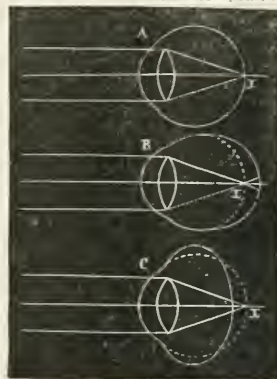


Fig. 85.—A. Normal Eye; B. Myopic Eye; C. Hypermetropic Eye.

stead of upon it. (B. Fig. 85). This condition is known as *Myopia*, or near-sight, and necessitates bringing the object very near to the eye, or the use of concave glasses, so as to give the rays greater divergence before they strike the cornea.

In other cases the diameter of the eye is so short that the retina is in front of the plane where the image would normally be formed by the lens. (C. Fig. 85). This is known as *Hypermetropia*, or long sight, and is remedied by convex glasses, whereby the rays are caused to converge and come more quickly to a focus.

In old age the crystalline lens gradually loses its power of accommodation, so that it tends to focus diverging rays behind the retina. This condition is known as *Presbyopia*, and is corrected in the same way as hypermetropia, by converging lenses.

Astigmatism consists of irregularity in the curvature of the cornea, rendering it impossible to see horizontal and perpendicular lines at the same time with equal distinctness. This defect is remedied by the use of glasses of cylindrical instead of spherical curvature, so that the light rays in some planes are refracted, while in others they are not changed.

Pharmaceutical Applications.—The practical applications of light and of optical instruments to the purposes of everyday life, as well as to the necessities of the arts and sciences, are so numerous and of such vast importance that even a brief description of all of them would fill volumes. Nevertheless, a few of these applications are of such special usefulness to the pharmacist in his determination of the purity and genuineness of the medicines which he dispenses to the public, as to be deserving of at least a passing mention.

The optical instruments which are of greatest use to the pharmaceutical chemist are the *Compound Microscope*, *Spectroscope*, *Polariscope*.

The Compound Microscope.—The simple microscope, consisting of a single bi-convex lens fastened in a suitable mounting, and giving a virtual, erect and enlarged image of the object looked at, has already been sufficiently described.

The compound microscope differs from the simple instrument in that the image formed by one lens is not viewed directly, but through another lens placed at some distance above the first, so that the image which the eye receives is the product of two magnifications. The lens at the lower end of the tube and nearest to the object is known as the *objective*, (A., Fig. 86), and the one at the upper end of the tube as the *ocular*, or *eye-piece*, (B. Fig. 86). Both objective and ocular are usually constructed of two or more lenses or combinations, which are corrected and adjusted so as to abolish spherical and chromatic aberrations.

The remaining parts of the compound microscope are the purpose of supporting and adjusting the optical parts, and for supporting and properly illuminating the object under examination.

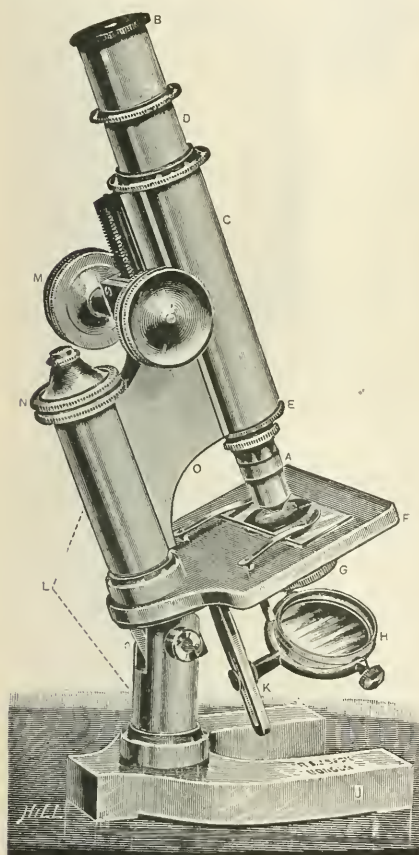


Fig. 86.—Objective; B, Ocular.

As the modern form of the instrument is quite complex and requires for its successful manipulation a special technique, a more complete description of its construction and use will be reserved for a separate list of papers to be presented at a later date.

The Spectroscope.—A simple form of spectroscope is shown in the engraving. (Fig. 87). At the axis of the instrument is a prism of flint glass. At one side is a collimator tube having at the end next the gas burner an adjustable slit and at the opposite end a convex lens. The object of this tube and lens is to direct a bundle of parallel rays from the slit upon the prism. Opposite the collimator is a telescope for viewing the spectrum produced, and between these is a third tube with an independent source of light, by means of which an engraved scale of fine lines is projected upon the prism and reflected thence into the telescope.

Continuous Spectra.—If the gas burner be removed and a beam of sunlight, reflected from a white cloud or white wall, be permitted to enter the slit of the collimator, the solar spectrum will appear to an observer at the telescope, along with an image of the engraved scale. Such a spectrum is known as a *continuous spectrum*, as it consists of a continuous band of colors.

If instead of sunlight, light from any ordinary source of illumination, as from an incandescent lamp, platinum

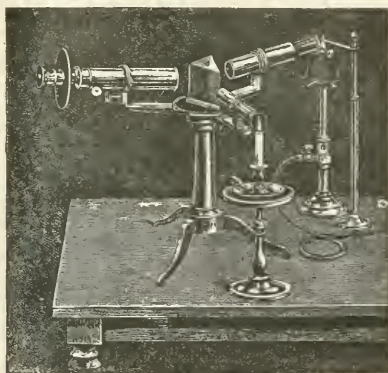


Fig. 87.—The Spectroscope.

wire, from a gas or candle flame, or from any other luminous solid or liquid, be examined, the same spectrum will appear. Hence the law that *all luminous solids and liquids give continuous spectra*.

It should be noted in this connection that the luminosity of a gas or lamp flame is due not to a luminous gas, but to the incandescence of solid particles of carbon in the flame, so that such spectra are, after all, the spectra of luminous solids.

Bright Line Spectra.—If the bunsen burner, giving a non-luminous and nearly colorless flame, be replaced in front of the collimator slit and a platinum wire loop, wet with a strong solution of sodium chlorid be held in the flame, the latter will be colored an intense yellow, and an observer at the telescope will behold not a continuous spectrum, but a single very bright yellow line projected on a dark ground. If now the wire be cleaned perfectly, and the experiment repeated with a solution of a potassium salt, a bright red line, and possibly also a violet line, will appear. In like manner a lithium compound will yield a carmine colored flame, and show a bright red, and a fainter orange line. Strontium salts color the flame crimson, and show lines in the red, orange and violet portions of the spectrum.

These bright colored lines are due to the volatilization of the metals contained in the compounds used, and are produced by all gases heated to incandescence, or *all incandescent gases give bright line spectra*. No two gases are known to give the same colored lines arranged in the same order.

Under very great pressure, an incandescent gas may give a continuous spectrum, like an incandescent liquid or solid.

Elements which are not volatile at the temperature of a bunsen flame, as iron or copper, may be vaporized and the vapor made incandescent by passing an electric spark between poles consisting of the elements, when their characteristic spectra appear.

Dark Line Spectra.—If a brilliant beam of calcium light or sunlight, be caused to pass through a bunsen flame colored by a sodium salt, a new effect is produced. Instead of the yellow line produced by the sodium light alone, there now appears a single dark line located in the same position. If instead of sodium, lithium, strontium, potassium or any other bright line producing substance be used, the bright lines in each case will be replaced by dark lines. In other words, *substances when in the state of vapor have the power of absorbing or "sifting out" the same rays they thus produce when luminous*.

The dark lines in each case are not really without light, but only appear so by contrast with the other more strongly illuminated portions of the spectrum.

Since these dark lines are produced by the absorption of certain light rays by the media through which they are passed, such spectra are known as *absorption spectra*, or because they are the reverse of the bright lines, as *reversed spectra*.

In like manner, many liquids and solids when light is passed through them give absorption spectra consisting of dark bands.

Spectrum Analysis.—From what has been said concerning the various kinds of spectra, it is evident that the spectroscopy affords us an important means of investigation concerning the nature and constitution of bodies. For example, as the sun gives a continuous spectrum, it must contain a nucleus of incandescent liquid or solid matter, and since this spectrum is crossed by numerous dark lines, it is evident that its central portion must be surrounded by a gaseous envelope containing the elements corresponding to those dark lines. Similar facts may be learned from the examination of comets, nebulae, the fixed stars and other heavenly bodies.

In like manner, by the study of bright lines and absorption spectra we are able to learn many things concerning terrestrial substances whose analysis by ordinary methods would be difficult, if not impossible.

With regard to the minuteness of the quantities of different substances which can be detected, no purely chemical tests can begin to compare in delicacy with the results of the spectroscopy. For example, it is stated that the one-fourteen millionth of a milligram of sodium may be detected in the flame of a bunsen burner, and that if the vapor be rendered luminous by the electric spark, the reaction is still more delicate. So, also, by combining the microscope and spectroscopy, as in the *microspectroscope*, a single blood corpuscle will serve to give the characteristic absorption spectrum of blood.

It was by the use of the spectroscopy that Bunsen, its inventor, discovered the elements rubidium and cesium, to which later investigators have added the elements thallium, indium, gallium and germanium, while by its assistance numerous important facts regarding many other elements have been brought to light.

The Polarimeter.—A simple form of polariscope and the theory of its action has already been described.

One of the most important forms of this instrument is the *saccharimeter*, employed to test the strength of sugar solutions, and depends for its usefulness upon the fact that such solutions have the property of turning a beam of polarized light to the right, the amount of rotation

depending upon the concentration of the solution.

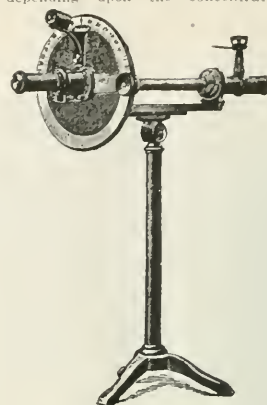


Fig. 88.—Polarimeter.

The nicols at each end having been crossed, a tube of known length is filled with the solution and introduced between the two prisms, when on looking through the analyzer the field will be seen to have become bright again. By rotating the analyzer through a certain number of degrees, depending upon the amount of sugar present, the field again becomes dark. The instrument must, of course, be standardized by determining by exact analysis the per cent. of sugar corresponding to each degree of rotation. (Fig. 88.)

Other modifications of the polarimeter may be used in a similar manner to determine the character of many medical and pharmaceutical substances, as the essential oils, etc.

PRACTICAL STUDIES.

(1) If convenient, obtain a crystal of Iceland spar (frequently found in mineralogical collections) and observe the phenomena of double polarization. Find the direction through the spar where refraction does not occur. What is this axis called?

(2) From a butcher obtain the eye of an ox or other animal, recently killed, and dissect it with a sharp knife. Identify each of the following parts: the sclerotic and choroid coats, the iris, retina, cornea, aqueous humor, crystalline lens, and vitreous humor.

SENIOR COURSE. LECTURE No. 25.

Fluid Extracts.—Continued. Collodions and Oleoresins.

SUB-CLASS B.

*FLUID EXTRACTS OF SPECIAL FORMULAE.

Ten official fluid extracts depart sufficiently from the formula of a typical fluid extract to justify their being given special consideration. Their special features may consist in some peculiarity in the ingredients, in the menstruum, or in the method of manufacture.

Compound Fluid Extracts.

Two fluid extracts are compound preparations, i. e., have more than one medicating ingredient. Only one, however, is known by the title "compound." In both cases a cubic centimeter represents one gram, not of a single drug, but of a mixture of drugs.

Aromatic Fluid Extract.—The menstruum is Alcohol, and the mode of preparation is according to the general formula of Sub-Class A. The special feature which brings this preparation within the present division is the fact that it is made from Aromatic Powder, a mixture of Cinnamon, Ginger, Cardamom and Nutmeg.

Compound Fluid Extract of Sarsaparilla.—The mixture of drugs consists of 750 Gm. Sarsaparilla, 120 Gm. Glycyrrhiza, 100 Gm. Sassafras, and 30 Gm. Mezereum, all in No. 30 powder. The menstruum is Alcohol, Glycerin and Water, and the manipulation corresponds to the general formula of Sub-Class A.

Fluid Extracts Made With Acid Menstrua.

Four official fluid extracts are made with a menstruum containing acetic acid. The acid is added to aid the ex-

traction by converting the alkaloids to the easily soluble acetates, and to hinder their decomposition during the evaporation of the weak percolate.

Fluid Extract of Conium. **Fluid Extract of Ergot.**—In both extracts the menstruum is Diluted Alcohol, to which has been added 20 Cc. Acetic Acid for 1000 Gm. of drug. In other respects the formulas and manipulations correspond to the general formula.

Fluid Extract of Sanguinaria.—The menstruum is Alcohol and Water, in the proportions of three to one, to which has been added 50 Cc. Acetic Acid for 1000 Gm. drug. In other respects the formula is like the preceding.

Fluid Extract of Nux Vomica.—The menstruum consists of 3 volumes Alcohol and 1 of Water, with 50 Cc. Acetic Acid for 1000 Gm. drug.

The drug is *digested* with this mixture for 48 hours before packing in the percolator. The exhaustion is completed in the usual manner, but the entire percolate is evaporated to 200 Gm. A small portion of this thick extract is then assayed by the official process, and the remainder dissolved in a sufficient quantity of a strongly alcoholic menstruum to make each 100 Cc. of finished preparation contain 1.5 Gm. of the mixed alkaloids, strychnine and brucine.

Fluid Extracts With Alkaline Menstrua.

Fluid Extract of Glycyrrhiza. **Fluid Extract of Senega.**—The menstrua are Alcohol and Water, with the

addition of 50 Cc. Ammonia Water for 1000 Gm. drug. The object of the ammonia water is to aid in the extraction of the glycyrrhiza of the first preparation, and to hold in solution the pectinous substances of the second.

Fluid Extracts Made With Boiling Water.

Two fluid extracts are made by exhausting the drug with boiling water, concentrating the aqueous infusion by evaporation, and fortifying with Alcohol.

Fluid Extract of Castanea.—The drug is first macerated with 5000 Cc. Boiling Water for two hours, expressed and the residue transferred to a percolator and treated with water until exhausted. The mixed liquids are evaporated on a water bath to 2000 Cc., cooled and 600 Cc. Alcohol added. When insoluble material has subsided, the clear portion is poured off, the remainder filtered and the united liquids evaporated to 700 Cc. When cold 100 Cc. Glycerin and sufficient Alcohol are added to make 1000 Cc.

Fluid Extract of Tritium.—The finely cut drug is packed in a percolator and percolated with Boiling Water until exhausted. The percolate is evaporated to 750 Cc., cooled, 250 Cc. Alcohol added, and let stand 48 hours. The liquid is then filtered and brought to 1000 Cc. with a mixture of one volume of Alcohol and three volumes of Water.

GROUP III. ETHEREAL PREPARATIONS.

Galencials in which ether is the principal menstruum or solvent.

Aether.—Ether.

The ether employed in the manufacture of official galencials is ethyl ether or ethyl oxid, $(C_2H_5)_2O$, containing about 4 per cent. of alcohol with a little water. Though it does not contain sulfur, it is commonly known as "sulfuric ether," owing to its always being prepared by the action of sulfuric acid on alcohol.

The ether of the U. S. P. is "a transparent, colorless, mobile liquid, having a characteristic odor and a burning and sweetish taste." Its specific gravity is 0.725 to 0.728 at 15° C., or 0.714 to 0.717 at 25° C. It is soluble in about ten volumes of water, and in all proportions in alcohol, chloroform, benzoin, benzol, and the fixed and volatile oils.

Ether of official strength should boil at 35° C., ebullition being produced when a tube is half filled with ether, some broken glass added, and the tube held in the hand.

The liquid is highly volatile and inflammable, and its vapor when mixed with air explodes violently on contact with light. Hence the pharmacopoeial injunction to keep ether and liquids containing it in well stopped bottles and remote from lights and fire.

Ether is one of the most valuable solvents of the pharmaceutical laboratory. It dissolves iodine, bromine, resins and balsams, fixed and volatile oils, waxes, most alkaloids, but not their salts, corrosive sublimate, sulfur, phosphorus, etc. It is not miscible with glycerin.

Two classes of galencials, the collodions and oleoresins, have ether as their principal solvent or menstruum. In the collodions the ether remains as a part of the finished preparation, while in the oleoresins it is used as a solvent merely, and is removed from the oleoresin by evaporation.

In all manipulations involving the use of ether it should be remembered that it is an inflammable liquid, very volatile, and that its vapor when mixed with air is highly explosive.

COLLODIA.—The Collodions.

A Collodion is a solution of Pyroxilin or Gun Cotton in a mixture of Ether and Alcohol, with or without the addition of a medicating ingredient.

By treatment with a mixture of Sulfuric and Nitric Acids, cellulose in the form of cotton is converted to the substance known as Gun Cotton or Pyroxilin, and becomes soluble in a mixture of ether and alcohol. Such a solution in proper proportions constitutes a collodion.

The collodions are meant for external application only. By the evaporation of the solvent the pyroxilin is left as a thin, impervious membrane on the surface.

This is a small class of preparations, numbering but four members, two of which are Simple Collodions, and two Medicated Collodions.

Owing to the highly volatile and inflammable character of their menstruum they should all be preserved in well

stoppered bottles in a cool place, remote from lights and fire.

Simple Collodions.

Collodion. Collodion.—This is prepared by macerating 30 Gm. Pyroxilin with 750 Cc. Ether for fifteen minutes, adding 250 Cc. Alcohol, and agitating until solution is effected. After the solution has cleared by subsidence, it is decanted to the bottle in which it is to be preserved.

Collodion Flexible. Flexible Collodion.—To prepare this collodion 30 Gm. Castor Oil and 30 Gm. Canada Turpentine are weighed into a tared bottle with 920 Gm. Collodion and mixed by agitation.

One of the objections to common collodion is the brittleness of the film which it forms. This property is overcome in this preparation by the Canada Balsam and Castor Oil, which give it flexibility and some degree of elasticity.

Medicated Collodions.

Collodion Cantharidatum. Cantharidal Collodion.—This preparation, also known as Blistering Collodion, is a solution of a concentrated, liquid, chloroformic extract of cantharides in Flexible Collodion. It is prepared by percolating 60 Gm. Cantharides finely powdered with Chloroform until exhausted, concentrating the resulting liquid by evaporation or distillation to 15 Gm., and mixing it with 85 Gm. Flexible Collodion. After subsidence, the clear liquid is decanted. Its composition, and the name of Blistering Collodion frequently applied to it sufficiently indicate its properties and usefulness.

Collodion Stypticum. Styptic Collodion.—This is an astringent and styptic collodion, which owes its properties to the 20 per cent. of tannic acid which is dissolved in it.

It is prepared by incorporating 20 Gm. Tannic Acid with a mixture of 5 Cc. Alcohol and 25 Cc. Ether, and adding sufficient Collodion to make up to 100 Cc. The mixture is agitated occasionally until the tannin is completely dissolved.

OLEORESINA. The Oleoresins.

An Oleoresin of the Pharmacopoeia is a liquid or semi-liquid mixture of the ether soluble portions of vegetable drugs, extracted by percolation.

As indicated by the name, the oleoresins are composed largely of essential oil, in which are dissolved resins, fixed oils or solid fats, alkaloids, and other plant principles soluble in ether.

All the official oleoresins should be preserved in well stoppered bottles. They are the most concentrated liquid preparations of their respective drugs, and are administered in small doses. The Oleoresin of Capsicum is intensely irritant to mucous surfaces, and the Oleoresins of Pepper and Ginger are also very acrid. Frequently on standing a portion of the solid fats or alkaloids deposit. These, if inert, should be rejected, but if active should be remixed with the liquid portions before dispensing.

They are made by percolation with ether in a percolator fitted for percolation with volatile liquids, and the excess of solvent recovered by distillation.

On the large scale the oleoresins are frequently manufactured with the use of a cheaper solvent, as benzoin or petroleum ether. This is of questionable propriety, as it is doubtful whether such preparations are identical with those made by use of the official solvent.

The natural oleoresins of the Pharmacopoeia, as Copaiba, Turpentine, etc., belong to the Materials of Pharmacy, and will receive consideration under the head of Materia Medica.

Six oleoresins are recognized by the present Pharmacopoeia.

Oleoresina Aspidii. Oleoresin of Aspidium.

Oleoresina Capsici. Oleoresin of Capsicum.

Oleoresina Cubebae. Oleoresin of Cubeb.

Oleoresina Lupulini. Oleoresin of Lupulin.

Oleoresina Piperis. Oleoresin of Pepper.

Oleoresina Zingiberis. Oleoresin of Ginger.

Except as noted below, they are prepared according to the following general formula:

500 Gm. of the drug in No. 60 powder is placed in a cylindrical glass percolator, provided with stop-cock, and arranged for percolation with volatile liquids, and pressed

firmly. The drug is then percolated with ether, added in successive portions, until exhausted. The greater part of the ether is recovered by distillation on a water-bath, the residue transferred to a capsule, and the remainder of the ether allowed to evaporate spontaneously. The finished oleoresin is to be preserved in well stopped bottles.

The variations from the above general formula are as follows: Lupulin is taken in its natural condition, with-

out powdering, and the directions are to *press very lightly*. Cubeb is taken in No. 30 powder instead of No. 60.

The cubebin, from Oleoresin of Cubeb, the piperin, from Oleoresin of Pepper, and the fatty matter from Oleoresin of Capsicum, which separates on standing, are rejected. The crystalline substance, illicic acid, which separates from Oleoresin of Aspillum, is to be reincorporated with the liquid portion before dispensing.

SENIOR COURSE, LECTURE No. 26

Materia Medica.

PROF. L. E. SAYRE, B.S.C., PH.M.

Gelatinous and Starchy Substances.

Ichthyocolla (Isinglass).—The swimming-bladder of *Acipenser Huso* Linne, and of other species of *Acipenser* (class Pisces; order Sturiones). In sheets or rods of a horny or pearly appearance, semi-transparent; almost entirely soluble in boiling water and in boiling diluted alcohol.

Gelatin is the air-dried product of the action of boiling water on gelatinous animal tissues such as skin, tendons, ligaments and bones.

Properties and Uses.—What has been said concerning the mucilage-yielding drugs, is applied, in a measure, to the classes under sections C. and D. (Gelatinous and Starchy substances.) These are also slightly nutritive, and, when externally applied, are protective. Used in acute inflammation of the alimentary canal, in pharyngeal, laryngeal and bronchial irritation, also used as light articles of diet.

Gelatin when not thoroughly clarified and otherwise purified, becomes the ordinary glue of commerce. The chief use of gelatine is in making capsules.

Resinous Substances.

Under section E we have a class of exudations differing from each other in physical properties. They are recognized as resinous substances. The type of the group resins is found in rosin (resina), which is the residue left after the distillation of the oil (oleum terebinthinæ) from gum (oleoresin) of turpentine. The other official members of the group are:

Elastica, India Rubber, caoutchouc. The prepared milk-jule of various species of *Hevea* (nat. ord. Euphorbiaceæ), known in commerce as Para Rubber.

Masticæ, Mastic. A concrete resinous exudation from *Pistacia Lentiscus* (nat. ord. Anacardiæ).

Other Resins. Besides the above we have one important official resin, Gualac, from the wood of *G. officinale*. This belongs to a class of more active agents and will be referred to later.

Unofficial: Elemi, Amber, Copal, Sandarac, Lac, Dammar and Asphalt. The first named is used in ointments and plasters, the others are almost exclusively employed in making varnishes.

Sandarac resin resembles Masticæ and is sometimes used to adulterate it. It may be distinguished from the former in having more elongated tears, also in becoming powdered when masticated, etc.

Amber (Succinum) is a fossil resin obtained principally from the shores of the Baltic, where it is cast up by the waves. It yields by distillation Oil of Amber, highly esteemed as an ingredient in certain liniments, etc.

Gum Resins and Balsams. Closely allied to the resins are the gum resins, such as Asafoetida and balsams, such as Tolu. These contain valuable medicinal substances, chiefly aromatic volatile oils which bring them into a group to be considered later.

Fatty and Oleaginous Substances.

Adeps, (Lard). The prepared internal fat of the abdomen of *Sus Scrofa* Linné (class Mammalia; order Pachydermata), purified by washing with water, melting, and straining. It should be kept in well closed vessels impervious to fat, and in a cool place.

Adeps Lane Hydrosus, (Hydrous Wool-fat). The purified fat of the wool of sheep (*Ovis Aries* Linné; class

Mammalia; order Ruminantia), mixed with not more than 30 per cent. of water.

Cetaceum. A peculiar, concrete, fatty substance, obtained from *Physeter macrocephalus* Linné.

Cera Alba (white wax). Yellow wax bleached.

Cera Flava, (yellow wax). A peculiar concrete substance, prepared by *Apis mellifica* Linné (class Insecta; order Hymenoptera).

Sevum (Mutton suet). The internal fat of the abdomen of *Ovis Aries* Linné (class Mammalia; order Ruminantia), purified by melting and straining.

The agents under F, from 27 to 32 inclusive, are external remedies applied locally to soften the skin and render it more pliable. They serve also as vehicles for other medicaments and are classified under the general heading, Emollients.

Other Emollients.—**Petrolatum**. A mixture of hydrocarbons prepared from petroleum. It is similar to the heavier petroleum oils, commercially known as Vaseline and Cosmoline, a most valuable emollient.

Oleum Theobromatis, Butter of cacao. From the seed of *Theobroma Cacao*, used to give form and consistency to suppositories.

Glycerinum, Glycerine. Exists in fixed oils and fats, in combination with fatty acids, obtained by decomposition of these fats and oils, a syrupy liquid of sp. gr. 1.250, soluble in all proportions in water or alcohol. It is nutrient, demulcent and in large doses laxative, much used locally as emollient.

Coloring Matters.

From the point of view of *Materia Medica* the drugs of this class are unworthy of much attention. The present list might be greatly extended, but all the drugs coming under this class are only useful in imparting an attractive color to various preparations.

Fibrous Substances.

In the last member of group 1, Fibrous Substances, *Gossypium* alone is mentioned. The common name for this substance is cotton, officially it is known as *Gossypium Purificatum* or purified cotton. The hairs of the seed *Gossypium herbaceum* Linné, and of other species of *Gossypium* (nat. ord. Malvaceæ), are freed from adhering impurities and deprived of fatty matter.

B.—Inorganic Non-Poison Drugs.

There are very few inorganic compounds or mineral salts which are in any measure therapeutically inert. It is very doubtful whether the following examples of this class can be much enlarged, that is, of course, if one confines himself to the official compounds.

Calcii Carbonas Præcipitatus, Precipitated Calcium

Carbonate.

Calcii Phosphas Præcipitatus, Precipitated Calcium

Phosphate.

Creta Præparata, Prepared Chalk.

C.—Aromatic Drugs.

The chief value of aromatic drugs proper lies in the volatile oil which they contain in various proportions. For example, peppermint contains about 1 per cent. and cloves as much as 18 per cent. of volatile oil. It is rarely the case when there is present as much as 10 per cent., about 2 per cent. being the average. The preparations into which the aromatics enter are very numerous and we find them in all classes of preparations, usually serv-

ing the same purpose, namely, of rendering them less unpalatable, in which case they occupy no important place therapeutically. In extracting the aromatic drugs a strong alcoholic menstruum is essential, but sometimes mixture with a small quantity of water is used, the latter serving to swell the cell wall, thus enabling the alcohol to dissolve the active constituents. Therapeutically the aromatics, when used alone, perform the part of stimulants and carminatives. They increase the organic activity, temporarily, of any part of the organism. They also aid in the expulsion of gas from the stomach and intestines, by increasing peristaltic action, stimulating the circulation, etc. Some drugs usually placed among the aromatics have other physiological properties; these will be referred to under this head after the aromatics proper have been mentioned.

The most important members of this group are as follows:

Anisum, Anise. The fruit of *Pimpinella Anisum* Linné (nat. ord. Umbellifere).

Calamus (Sweet Flag). The rhizome of *Acorus Calamus* Linné (nat. ord. Aroideæ).

Carum, Caraway. The fruit of *Carum Carvi* Linné (nat. ord. Umbellifere).

Cardamomum, Cardamom. The fruit of *Elettaria repens* (Sonnérat) Baillon (nat. ord. Scitamineæ).

Cinnamomum Cassia, Cassia Cinnamon. The bark of the species of one or more undetermined species of *Cinnamomum* grown in China (Chinese Cinnamon) (nat. ord. Laurineæ).

Cinnamomum Saigonicum, Saigon Cinnamon. The bark of an undetermined species of *Cinnamomum* (nat. ord. Laurineæ).

Cinnamomum Zeylanicum, Ceylon Cinnamon. The inner bark of the shoots of *Cinnamomum zeylanicum* Breyné (nat. ord. Laurineæ).

Caryophyllus, Cloves. The unexpanded flowers of *Eugenia aromatica* (Linné) O. Kuntze (nat. ord. Myrtaceæ). *Coriandrum, Coriander.* The fruit of *Coriandrum sativum* Linné (nat. ord. Umbellifere).

Fœniculum, Fennel. The fruit of *Fœniculum capillaceum* Glibert (nat. ord. Umbellifere).

Illicium (Star-Anise). The fruit of *Illicium verum* Hooker filius (nat. ord. Magnoliaceæ).

Limonis Cortex, Lemon Peel. The rind of the recent fruit of *Citrus Limonum* Risso (nat. ord. Rutaceæ).

Macis, Mace. The arillose of the seed of *Myristica fragrans* Houttuyn (nat. ord. Myristicaceæ).

Myristica, Nutmeg. The seed of *Myristica fragrans* Houttuyn (nat. ord. Myristicaceæ) deprived of its testa.

Pimenta (Allspice). The nearly ripe fruit of *Pimenta officinalis* Lindley (nat. ord. Myrtaceæ).

Sassafras. The bark of the root *Sassafras Varifolium* (Salisbury) O. Kuntze (nat. ord. Laurineæ).

Other Aromatics.

There are a few members of this class that are sufficiently active as remedial agents to be administered alone in simple preparations. These drugs are valuable for their carminative qualities. An example of this class is:

Zingiber, Ginger. The rhizome of *zingiber officinale* Roscoe (nat. ord. Scitamineæ). Off. Preparations are: *Extractum Zingiberis Fluidum*, *Oleo-resina Zingiberis*, *Pulvis Aromaticus*, *Pulvis Rhei Compositus*, *Tinctura Zingiberis*.

In addition to the preceding drugs there are a few, generally classified among aromatics, which have other therapeutical qualities in addition to the simple aromatic quality. These are used in medicine chiefly on account of their other therapeutical qualities; Examples:

Buchu. The leaves of *Barosma betulina* (Thunberg) Bartling et Wendland, and *Barosma crenulata* (Linné) Hooker (nat. ord. Rutaceæ). Constituents: Vol. oil about 1 per cent., resin, bitter principle, etc. Off. Prep.: *Extractum Buchu Fluidum*. Uses: It is slightly diuretic and a gentle stimulant to secretions generally, with a selective action on the urinary mucous membrane. Dose, 15-30 gr.

Cascariæ. The bark of *Croton Eluteria* Bennett (nat. ord. Euphorbiaceæ). Constituents: A crystalline bitter principle, cascariæ, a volatile oil, a resin, and some tannic acid. It is a pleasant aromatic bitter, and may be used for the same indications as *serpentaria*. It is also used in fumigating mixtures. Dose, 15-30 gr.

Chenopodium (American Wormseed). The fruit of *Chenopodium ambrosioides* Linné, variety *anthelminticum* Gray (nat. ord. Chenopodiaceæ). Uses: In the form of an infusion and in the preparation of a volatile oil. Dose, 15-45 gr.

Cubeba, Cubeb. The unripe fruit of *Piper Cubeba* Linné filius (nat. ord. Piperaceæ). Constituents: Volatile oil 10 per cent., resin, cubebin, cubebic acid. Off. Prep.: *Extractum Cubebæ Fluidum*; *Oleo-resina Cubebæ*; *Tinctura Cubebæ*. Uses: Powdered and mixed with potassium sulphate used as Catarrh snuff, made into a paste with mucilage and copaiba for gonorrhœa, etc. Dose, 15-60 gr.

Eriodictyon. The leaves of *Eriodictyon glutinosum* Benthams (nat. ord. Hydrophyllaceæ). Constituents: Volatile oil, an acid and possibly a glucoside. Off. Prep.: *Extractum Eriodictyi Fluidum*. Dose, 20-60 gr.

Eucalyptus. The leaves of *Eucalyptus globulus* Labillardière (nat. ord. Myrtaceæ) collected from the older parts of the tree. Constituents: Volatile oil 6 per cent., resin, tannin. Off. Prep.: *Extractum Eucalypti Fluidum*. Uses: As a stimulant expectorant in acute and chronic bronchitis, also externally as a wash in gangrene, etc. Dose, 5-15 gr.

Hedeoma (Pennyroyal). The leaves and tops of *Hedeoma pulegioides* (Linné) Persoon (nat. ord. Labiatæ). Constituents: Volatile oil. Uses: As infusion to bring on retarded or suspended menstruation. Dose, 15-60 gr.

Marrubium (Horsehound). The leaves and tops of *Marrubium vulgare* Linné (nat. ord. Labiatæ). Constituents: Volatile oil, resin, marrubium, tannin. Uses: As infusion and as an ingredient in cough syrups.

Matico. The leaves of *Piper angustifolium* Ruiz et Pavon (nat. ord. Piperaceæ). Constituents: Resin, tannin, volatile oil and a bitter principle, maticin. Off. Prep.: *Pilule Aloes et Mastiches*. Uses: A tonic and a stimulant to diseased mucous membranes, also as a hæmostatic. Dose, 15-60 gr.

Aurantii Amari Cortex, Bitter Orange Peel. The rind of the fruit of *Citrus vulgaris* Risso (nat. ord. Rutaceæ). Constituents: Volatile oil and Hesperidin. Off. Prep.: *Extractum Aurantii Amari Fluidum*, *Tinctura Aurantii Amari*, *Tinctura Cinchonæ Composita*, *Tinctura Gentianæ Composita*. Uses: In tinctures, tonics and bitters.

Piper, Pepper (Black Pepper). The unripe fruit of *Piper nigrum* Linné (nat. ord. Piperaceæ). Constituents: Volatile oil $\frac{1}{2}$ per cent., piperin, pungent resin. Off. Prep.: *Oleo-resina Piperis*. Uses: When added to anti-chill pills it renders other remedies, such as quinine, more active.

Mentha Piperita, Peppermint. The leaves and tops of *Mentha piperita* Smith (nat. ord. Labiatæ). Constituents: Volatile oil 1 per cent., pimenthol, resin, tannin. Off. Prep.: *Spiritus Menthæ Piperitæ*. Uses: As an infusion and for obtaining oil of peppermint. Gives a green color to an alcoholic solution of the oil in essence of peppermint.

Rosa Centifolia, Pale Rose. The petals of *Rosa centifolia* Linné (nat. ord. Rosaceæ). Constituents: Volatile oil, sugar, mucilage, quercitrin. Off. Prep.: *Syrupus Sarsaparillæ Compositus*. Uses: In perfumery and fumigating powders, etc.

Rosa Gallica, Red Rose. The petals of *Rosa gallica* Linné (nat. ord. Rosaceæ) collected before expanding. Off. Prep.: *Confectio Rosæ*, *Extractum Rosæ Fluidum*, *Pilule Aloes et Mastiches*. Uses: A vehicle for bitter drugs, also a gargle for sore throat.

Crocus, Saffron. The stigmas of *Crocus sativus* Linné (nat. ord. Iridæ). Constituents: Volatile oil, Crocin. Off. Prep.: *Tinctura Croci*. Uses: As a dye, also to produce diaphoresis in measles. Dose, 5-30 gr.

Scutellaria (Scullcap). The herb of *Scutellaria lateriflora* Linné (nat. ord. Labiatæ). Constituents: Oil, bitter principle, tannin. Off. Prep.: *Extractum Scutellariæ Fluidum*.

Sumbul. The root of *Ferula sumbul* (Kauffmann) Hooker filius (nat. ord. Umbellifere). Constituents: Volatile oil, 1-3 per cent., angelic and valerician acids and bitter extractive. Off. Prep.: *Tinctura Sumbul*.

Tanacetum, Tansy. The leaves and tops of *Tanacetum vulgare* Linné (nat. ord. Compositæ). Constituents: Volatile oil, $\frac{1}{4}$ per cent., bitter principle, resin, tannin. Uses: In the preparation of oil and to bring on suspended menstruation. Dose, 15-60 gr.

Valeriana, Valerian. The rhizome and roots of

Valeriana officinalis Linné (nat. ord. *Valerianæ*). Constituents: Volatile oil $\frac{1}{2}$ to 2 per cent., valerianic, formic and acetic acids, and resin. Off. Prep.: *Extractum Valerianæ Fluidum*, *Tinctura Valerianæ*, *Tinctura Valerianæ Ammoniatæ*. Uses: Slightly stimulates the circulation, chief value is in hysterical conditions, also used as an antispasmodic in pertussis, asthma, and spasmodic conditions generally. Dose, 15-75 gr.

Vanilla. The fruit of *Vanilla planifolia* Andrews (nat. ord. *Orchideæ*). Constituents: Vanillin, fixed oil, resin. Off. Prep.: *Tinctura Vanilla*. Uses: As a flavoring agent in the form of a tincture.

GROUP 2.—DRUGS WHICH ARE ACTIVE BUT NOT CLASSIFIED AS POWERFUL OR POTENT.

There is a large class of agents among the official drugs which are not possessed of much inherent power medicinally. These are, however, by no means lacking in therapeutical virtue. Although considered feeble from the standpoint of pharmacodynamics, many of them are of pronounced value as remedial agents. Take as an example the simple bitters: *Genlian* and *Chirata*. They are efficient agents. Their efficiency is due to local action upon the mucous membranes of the gastro-intestinal tract with which they are brought in contact. They increase the secretions, aiding digestion, and become valuable re-

storative agents, improving nutrition. Immoderate use and continuous dosage of these however, could have no toxic effect, in the sense in which this term is used by the toxicologist. Thus we have here drugs which are in a sense active and at the same time cannot be placed among the potent drugs of Group 3.

It is possible to select a large list of domestic drugs of this class that the druggist is called upon to dispense, but we will confine ourselves to a few official examples. Were we to define the class more definitely than we have done, we should say that any drug whose minimum dose was a high as 30 grains might be placed in this group. The official examples given below are alphabetically arranged.

Anthem. Flowers.	Pareira, Root.
Calumba, Root.	Pepo, Seed.
Cassia Fistula, Fruit.	Quercus Alba, Bark.
Castanea, Leaf.	Quassia, Wood.
Chirata, Herb.	Rhus Glabra, Fruit.
Ficus, Fruit.	Rosa Gallica, Petals.
Galla, Excrecence.	Sarsaparilla, Root.
Genlian, Root.	Taraxacum, Root.
Geranium, Rhizome.	Tamarindus, Fruit.
Krameria, Root.	Triticum, Rhizome.
Lappa, Root.	Uva Ursi, Leaf.
Matricaria, Flower.	

The student will attach to each of the names, the botanical origin, natural order, habitat, physical properties, therapeutical uses, dose and official preparations.

IMPORTANT NOTICE TO THE STUDENTS OF THE ERA COURSE.

The Director has received information to the effect that a mail sack containing a large number of letters to students of the Era Course was accidentally thrown under the wheels of a train, and more or less of the mail matter which it contained destroyed.

Any students who have not at this date received

questions upon lectures subsequent to No. 12 will please send notice at once to the director.

The director also wishes to call the attention of students to the fact that all questions upon lectures are mailed to students immediately upon their receipt from the printers. The recollection of this fact will save needless correspondence.

(For the Era.)

ETHICAL WINDOW EXHIBITS.

BY JOSEPH F. HOSTELLEY.

Often has the worthy advocate of ethics asked the question: "Why do not druggists dress their windows more in keeping with their professional status?" and we echo the query, why do they not, sometimes, at least? One becomes so accustomed to seeing displays of a like or similar nature, exhibits that speak, often not well, of the commercial rather than the professional side of pharmacy, trims that appeal always direct to the pocket book, and but little to the instincts of naure that appreciate learning, and the man of intellectual abilities; we see so many of these cold solicitations for trade that they become uninteresting, and relate one pharmacy with its neighbor and the two with the stores of mere merchants. It would trouble one much to find a class of stores offering such a diversity of matter from which to design attractive and instructive exhibits as do drug emporiums. No exchange is so replete with goods having interest for such a number of people as is the drug market. Young or old, of either sex, find herein something to satisfy a whim or fill a want; something indispensable to comfort or necessary to health.

If, week after week, you trim your windows in something the same fashion, display in them now some soap and then some sponges or "patents," just as contemporaries by the dozen are doing, how can you look for real attention from those who see no speakable difference between the garb of your windows and others they pass? Can you censure them, even mildly, for somewhat connecting you, your stock and your store with other men in business dissimilar to your own? They are greeted so invariably with arguments, clearly intended to open the purse they scarcely can be blamed. Give the public evidence of a training that deals not alone with the sale of sundries. Disabuse the thoughtless minds of the fallacious tendency to look upon you as a mere tradesman, a commercial relative of the butcher and baker on opposite corners. Illustrate to them and to all, that they may read as they run, the delicacy of your position, the sensitiveness of your responsibility, the vast nature of your knowledge. The doctrine that if a man deserves merit

he shall surely receive it, the better it be that he modestly allow others to discover his worth while he remains apparently unconscious of his accomplishments—may be good counsel in a way, but we believe in a man sounding his own trumpet occasionally, certainly not hiding his light under a bushel. "A man may hold his tongue in an ill time."

We have asked you to decorate your windows consistently with your profession, once in a while, at all events, now we tell you how it might be done: As Prof. Remington has said, "Chemical or pharmaceutical apparatus, tastefully displayed, rarely fails to excite the admiration of the passer-by while if some simple pharmaceutical process is shown in automatic operation, such as the distillation of water or colored liquids in glass retorts, with a glass Liebig condenser, two objects are gained; a supply of the distillate is secured, and the reason for possessing the window is legitimately realized." Let us, then, consider a display of pharmaceutical appliances.

First, cover floor of window with sheets of white paper. Envelop a soap box in the same material, and, after placing it in the center of the window, wall back, stand upon it a pair of brightly polished prescription scales, on either side of which distribute metric, gram and drachm weights. The scales have the seat of honor; now to allot positions for other laboratory appurtenances. Beneath the scales, on a low box, dressed as was the first, let there be a mortar of generous proportions, with accompanying pestle protruding, and about it bring together three or four smaller ones likewise supplied with pestles. On the floor, before this box, stand two or more graduated of differing sizes and lay between them several spatulas—steel, horn or bone and wood. On each side of the larger box place a percolator of one or two gallons capacity and also a smaller one. Four funnels varying in dimensions are likewise distributed. Then, guided by your own tastes, assemble in the vacant spaces a pill-machine, evaporating dishes, stir rods, beakers, flasks, infusion mug, filter paper, folded and flat, rubber and

glass tubes, precipitating jars and such apparatus as you deem advisable or appropos. On each utensil affix a card bearing the title of the implement, and, if thought necessary to a clear insight, a terse, unequivocal description of its use. On the infusion mug, for instance, in addition to the name, print upon the card Prof. Remington's definition of an infusion. Some may criticize the honor shown the scales, inasmuch as a mortar is symbolical of pharmacy. Well, that's a weighty argument, but many operations are conducted in store and laboratory in which a mortar does not figure, but the balance is seldom absent. Suit yourself, however. This display might be modified somewhat or varied by arranging a number of utensils in one window, labeled, and direct attention to an illustration of their use in another window. In this way percolators, funnels, stills, condensers, etc., could have their utility to the pharmacist made obvious.

Next in order, after the apparatus, the most essential adjunct to the work of the druggist are his books (contradiction pardoned). How many customers ever see your library? How many realize the labor of keeping abreast of the times? Expose a portion of your pharmaceutical literature in this wise. Upon a carpet of immaculate white paper lay a number of text books in the window, open to the eyes of those who read. Better use the boxes of the former exhibit and elevate the pharmacopoeia above its fellows. We dictate no further as to arrangement, in this instance, but would suggest the utilization of as many volumes as the window will accommodate or library furnish. Some pharmaceutical journals will certainly be not amiss; in fact, the exhibit would be incomplete without them. Don't mind if the editions are finger printed, so much the better, possibly; such stains appear as merit marks to the credit of pharmacy. A placard might be in evidence, reading: "We are not without reference to determine weighty problems," or the following: "Ask us what you will of pharmacy, we can answer it, if ever text book taught it." A protection from flies in the form of mosquito netting should enclose the window from the back.

Many leaves that are of medicinal value would aid in attracting attention to your window, if well arranged. From old boards build a large frame, say 4 x 6, and cover with white paper. Select specimens of leaves that can be gotten in entirety and attach them to the frame by some mucilaginous substance. Let senna, uva ursi or pipissewava leaves form a border for those of greater proportions. Label all with common names and synonyms and stand them in the window near the glass. To each side stand glass jars filled with still other leaves, labeled. The exhibit-structure could be made to display various salts by affixing to it a number of pill or rother small pasteboard boxes, by the aid of an adhesive mixture, filling them with the salts, properly labeled, and inclining the contrivance, using one or two boxes in the rear of the window space to facilitate the operation. The containers that held leaves are superseded by ones accommodating salts and made to occupy the same relative positions.

Another expedient for exhibiting crystallized salts is to select two clean hoops from a flour barrel, one smaller than the other, and sand paper them. Then cut the smaller one and draw it together sufficiently to admit its slipping within the other, with about two inches intervening between it and the larger hoop, after which unite the severed ends. Lay the two hoops on a level surface, one within the other, and secure them in this position by means of circular pieces of cardboard, two inches wide, tacked across the edges of one side of each. One circular piece is preferable if obtainable of such dimensions. In like manner arrange several devices. Paint white and fill with crystals of various salts, copper sulfate, ferrous sulfate, magnesium sulfate, potassium bichromate, alum, etc. From four strips of smooth wood fashion a square that will fit within one of these contrivances with no space to spare at the corners. Then shape another square which will lie within the first with a two inch space to the credit of each side. Hold them at this distance by means of strips of cardboard or wood fastened across the edges of one side. Now you have formed a square trough, open all around like the one made with the hoops. Design as many of these as of the other concepts, color white also, and make them hold



crystals of still more salts. Now, from discarded boards, build a frame proportionate to the size of the window, or use that of previous trim and, after covering it with some black or very dark fabric, place it in the window on an incline from the front, that its surface may be seen from the street. It would be well to have it large enough to accommodate from four to six of the hoop devices, which are laid thereon, the squares fitted into position and the crystals properly labeled. In the center of each square assemble large, well-formed crystals or boxes of paper board filled therewith. These fittings can be used for displaying all manner of dry drugs.

Color, life and animation are factors concurring to make catchy, successful exhibits. Ethereal taboo neither of these. The variety of colors naturally exhibited by solid official substances, particularly salts, render these medicinal agents of service to the druggist as solicitors of interest and attention to his window space; at least they might, did he but wish it. To display some of these substances, attractive in form and hue, in flint glass jars and bottles, is to please the eye of the passing pedestrian. Among the subjects of the exhibit he may see something he could use, and, favorably impressed by its appearance, make a purchase. If not, the decoration will stand as a monument to the pharmaceutical and artistic skill of the druggist, the former particularly if some of the chemical products are created from the armamentarium of his own laboratory. The various colors in which some of these different substances would appeal to the eye of the onlooker are: Copper sulfate, deep blue; ferrous sulfate, bluish-green; antimony sulfate, steel-grey; manganese sulfate, pale rose; potassium bichromate, orange-red; potassium ferrocyanide, lemon-yellow; ferric citrate, garnet-red; ferrous lactate, greenish white; red mercuric iodide, scarlet red; yellow mercurous iodide, greenish yellow; animal charcoal, dull black; manganese dioxide, grayish black; stannic sulfide, golden yellow; sulfur, lemon yellow; innumerable are the colorless and white salts. A look about the store will call to mind a score or more other drugs that might, by their presence, lend aid to a display of colors; an exhibit that would gratify the eye of all but the most phlegmatic. Liquids might supplant solids. Now, let us look a little to the arrangement of the matter chosen. We would suggest that empty boxes be congregated in the window in the form of a crescent with horns touching the window pane; pile them high in the center and by degrees or distinct steps slope to the horns; thus forming small elevated platforms, one above the other. Now, within this crescent build another similar that will be beneath it a short distance at all points. Construct as many of these designs as the window will receive, and when the flight of steps is completed cover entirely with colored paper or cloth. A combination of colors would heighten the effect, otherwise employ white. Upon the steps place jars, bottles and various glass receptacles filled with the multi-colored products to be displayed. Let the largest vessels be put in the center, the smallest ones at the front. Blend the hues artistically and distribute them well. And don't neglect to label distinctly.

A pleasing exhibition of some of the products of nature and man's ingenuity might be managed in this style:

Collect with care specimens of all, or nearly all, substances and mixtures of which calcium is the chief or only ingredient. Native limestone, chalk, marble, etc., chlorinated lime, lime water, syrup and liniment of lime, prepared chalk, chalk mixture, troches of chalk, etc. These to be labeled and exposed to view something as purposed for preceding rim, allotting the topmost positions to the uncombined and crude element. If thought desirable and a spacious window be available, several elements may be treated in this manner in the same display. Care must be exercised in proper classification. Confusion detracts from the general effect and lessens the instructiveness of the exhibit. Mercury might be selected as the material whose uses are to be elucidated in part, the metal itself occupying the commanding position and grouped about its "feet" mercurial salts, ointment and plaster. A mercurial thermometer might not be out of place here. Some hints how to counteract the effects of corrosive sublimate internally administered should prove a boon to the uninitiated. Opium would well be considered as a subject for treatment in this peculiar way, the soporific exudation itself being most conspicuously in evidence; the dry poppy capsules, the alkaloids and pharmaceutical preparations being treated of. It might be well to omit paregoric; its presence here might trouble the minds of mothers. "Where ignorance is bliss 'tis folly to be wise." Antidotes would be opportune. A coffee-pot may center this latter group. A display of acids, liquid and solid, would make an inexpensive, inviting exhibit. An explanatory placard could adorn each bottle and vial—some few words telling one or more sources of each acid, e. g.: "Hydrochloric Acid. Made from common salt." Nitric Acid. Manufactured by acting upon saltpetre with sulfuric acid." Acetic Acid. Yielded by wood and vinegar through distillation." Vegetable drugs are deserving of regard. Then there are the animal derivatives: Lard, lard oil, suet, cod-liver oil, sugar of milk, lactic acid, isinglass, wax, spermaceti, pepsin, musk, etc. Oils could well be considered separately.

Deplete some of the pharmaceutical uses of various woods in this way: Muster in the window billets of miscellaneous specimens of wood and samples of such substances as are surrendered by the latter which are of intrinsic value to man. These derivatives are manifold and an interesting display can be formulated with them as the theme. The sections of wood add a look of completeness to the exhibit. Some few of the products that should be in evidence are, wood alcohol, turpentine and oil of same, resin, charcoal, oxalic and acetic acids, tar, creosote, mastic, burgundy pitch, myrrh, guaiac, benzoin, benzoic acid, syrups of tar, wild cherry, tolu, etc., etc.

Any wide-awake druggist can elaborate upon the ideas expressed above, and, cognizant of the properties and uses of the materials that surround him, both in medicine and the arts, he can delight those who pass his store by window scenes expressing the utility and application of various drugs and chemicals.

It would be well for a pharmacist to make memoranda of queries asked himself and clerks pertaining to his legitimate stock, and then endeavor to explain some of the perplexities by means of window examples. We refer now to questions bearing upon subjects of universal interest; the latter being demonstrated by the frequency of the inquiries. If the question to be regarded has arisen from your frequent customers they would, doubtless, feel flattered were they to see their interests so appreciated that they are made the subject of the close attention a window display of this nature would naturally suggest; and they might also become more frequent visitors. A chance buyer would hardly merit such consideration from the fact that transient trade is fleeting and very difficult to keep any reliable account of. Hints should be much esteemed, however, no matter the source. From recollections of queries put to us we would advise the following exhibits being made: A display typifying the distilling of Witch hazel water, with shoots and twigs disseminated about the window space. The percolation of tincture of ginger made clear, receptacles containing the several varieties of the rhizome, powdered, and in entire pieces, being identified with the process. The paraphernalia essential to pill making exposed to view; the inevitable hand machine, tile, finisher and ejection bottle, if fact,

several of the latter containing honey, glycerin, syrup, macilage of acacia, confection of rose, etc. Odd notions attend the use of glucose; the latter are somewhat prejudiced; better not show it in this connection. One or more pill coating devices should be shown, pills finished and in various stages of manufacture, and pill boxes. These diverse objects should not be hurriedly accommodated to certain attitudes, but their disposition should be carefully calculated, and the execution of the exhibit be an echo of the scientific nature of the profession you follow. The same care and caution should be bestowed upon each and every change of dress you select for your windows. Dignify them with attire stylish, modest and "tailor-made." No "ready-to-order, shop worn" goods that seem to speak only of bargains and cut prices. Design ethical, professional exhibits that will render it easy for even the illiterate and the superficial observer to differentiate between your pharmacy and the shop of the "cutters." Lend your assistance toward the elevation of the profession you have chosen as a means of livelihood. Keep up with the times in an appropriate, legitimate way. Be progressive, but be professional.

PRODUCT PATENTS FROM A PHARMACEUTICAL STANDPOINT.

BY WILLIAM L. CLIFFE, PH.G.

"The Congress shall have power . . . to promote the progress of science and the useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."—Constitution of the United States, Art. 1, Sec. 8.

Acting under this constitutional mandate, the Congress of the United States enacted a statute in 1790, providing for the granting of patents upon things described as an "art, manufacture, engine, machine or device, or any improvement thereon."

From this as a nucleus was evolved a model of legislative brevity which is the fundamental law covering the granting of patents at the present time, and which was in force during the time most of the chemical product patents, which it is the purpose of this paper to discuss, were obtained. (Section 486, Revised Statutes, U. S.)

This statute, in force, provides for the granting of patents upon four classes of inventions, named therein as an *Art, Machine, Manufacture and composition of matter*. These are really increased to eight classes, as pointed out by Hon. Benjamin Butterworth, Commissioner of Patents (1884, 30 Official Gazette, 1321), by the additional "for any new or useful improvement thereon."

From a chemical and pharmaceutical standpoint, under this law, there can be two classes of patents granted: one for an art, which is commonly described as a process patent; and another kind for a composition of matter, generally referred to as a product patent.

To the chemist seeking as a patentee a monopoly upon the results of his inventive skill, it is clearly a matter of self-interest to secure a product patent whenever he can do so by claiming invention of the product of a chemical process.

The reason for this is obvious: granting a patent upon the end product of a chemical process effectively bars all possibility of competition with other inventors working in the same field.

It seems clear to the mind of a layman that this restriction of improvement is clearly in opposition to a fundamental provision of patent legislation as expressed in the statute, to wit, "for any new and useful improvement thereon."

Decisions by courts of last resort are not wanting in which this opinion seems to be sustained. Frequently have the claims of patents been rejected and stricken out on account of being broad enough to kill all competitive exercise of the inventive faculty during the life of the patent.

A notable instance being the Morse Telegraph Patent; the eighth claim of this patent was considered by the Supreme Court to be for the use of the electric current for making intelligible signs at any distance. The Supreme Court held this claim to be void. (O'Reilly vs. Morse, 13 Howard, 112, 1833.)

This patent, if granted, would have covered the use of a principle and shut out from all competitors the use of

the electric current for telegraphic purposes; "any new and useful improvement" over Morse's invention could not have been utilized. In clear distinction to this in the line of chemical patents, stands the process patent or a patent for an art (in a patent law sense); in granting which, of course, the proof of exercise of the inventive faculty is and should be demanded. Pettit (law of inventions, 1895) defines process in its patent law sense in the following terms: "A process may be said to be a directing or training of a force in a given manner through the medium of physical agents applied to material objects, whereby are produced material effects."

Probably one of the best illustrations of a chemical process patent was that granted to Richard Tilghman, of Philadelphia, for the manufacture of glycerin by the action of super-heated steam upon fats.

The claim of this patent was for "the manufacture of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure."

Had Tilghman been able to claim the invention of the product, glycerine (discovered by Chevreul in 1813), he would never have been called upon to defend his patent by suing Proctor for infringement, because no matter what improvements Proctor made or hoped to make would be shut out by the stone wall of an end product patent, during its term. To illustrate the advantages enjoyed by the chemical patentee who is lucky enough to secure a product patent over his confrere who invents a machine, the following is a good illustration. A patent was granted upon a machine for sawing shingles; another was granted for an improvement consisting of the identical machine with a circular saw substituted for a perpendicular reciprocating saw. This patent for improvement was granted to the original inventor, but the logic of the law would require the grant to any other inventor. *Earl vs. Sawyer*, 4th Mason 1, 1825.)

With this summing up of the legal aspects of product patents, it would be well to proceed to the consideration of the

Commercial Aspects.

Clear up to the early '80's, very little advantage was taken of the liberal provisions of our patent laws, but about this time, enterprising chemists in Germany (our laws permit foreigners to take out patents) saw the possibilities of the situation in the United States. After a few tentative patents, the ventures proved profitable beyond the clear calculations of commercial prescience. At the present time, there are no reports from the patent office which do not include numerous examples of this class of patents granted to German inventors. These patents are generally assigned to trustees in this country for the purpose of protection against infringement and of managing the business of selling. In almost every instance, the product is made abroad, originating to this country nothing but the ad valorem tariff duty on their *actual value* as commercial commodities. The prices at which they are sold here are clearly indicative of a greed and rapacity which seem to be unrivaled in any other form of commercial monopoly. Taking, for instance, the case of phenacetin; it is probable that the outside approximate cost of this article, landed in this country, duty paid and put up in 1-ounce packages, is 10 cents per ounce, the selling price to the trade is \$1 per ounce. To get an accurate idea of what had been wrested from the people of these United States upon this one article, the writer appealed to the Bureau of Statistics of the Treasury Department, but received the information that prior to 1895 there are no records of any importation of phenacetin, as such, and since that time only a few thousand ounces have been imported; these being various lots that were imported by others than the accredited agents of the trustee in claimed infringement upon the rights of the patent. The chemical and pharmaceutical trade in this country hold to the opinion that an estimate of 300,000 ounces a year for the term of the patent is conservative. Deducting the cost and jobber's commission would leave about 75 cents per ounce, amounting in this case to \$22,025,000. Think of this from one product alone! In the case of others, which did not present the possibilities of such extended use as phenacetin, the ratio of percentage profit was increased, sometimes trebled or quadrupled.

Antipyrin was never as popular as phenacetin, but it is probable that nearly as much profit was obtained from

the monopoly during its life, as it sold for \$1.35 per ounce.

This then, is a condition of affairs here, but how different in Germany! There, the financial increment has built up numerous finely equipped laboratories, with scores of trained chemists and investigators, whose sole duty to the companies in control is to find some new and useful composition of matter to patent in the United States. Germany undoubtedly scented the possibilities of the chemical product patent monopoly first, and, having the finest laboratories of instruction at that time, has greatly increased her advantages and organized facilities through the aid of dollars stamped U. S.

It might be asked "What were our own chemists doing in not taking advantage of a condition of affairs which was presumably created for their benefit?" The question is capable of an answer which proves them the victims of ulterior conditions, but for the purpose of this discussion, it would be too lengthy to consider at this time.

There is still another side to this question, namely, its ethical one, which has always been a prominent factor in any question in which medicine and pharmacy has been involved. This factor has been ably handled in editorials in the various drug journals.

Note.—The legal authorities used and quoted are Robinson on Patents, Vol. 1; Walker on Patents, third edition, 1895; Pettit, Law of Invention, 1895.

HOW TO POSTPONE OLD AGE.*

Anatomical experiment and investigation show that the chief characteristics of old age are the deposits of earthy matter of a gelatinous, fibrinous character in the human system. Carbonate and phosphate of lime, mixed with other salt of a calcareous nature, have been found to furnish the greater part of these earthy deposits. As observation shows, man begins in a gelatinous condition; he ends in an osseous or bony one—soft in infancy, hard in old age. By gradual change in the long space of years the ossification comes on; but, after middle life is passed, a more marked development of the ossific character takes place. Of course these earthy deposits—which affect all the physical organs—naturally interfere with their functions. Partial ossification of the heart produces the imperfect circulation of the blood which affects the aged. When the arteries are clogged with calcareous matter there is interference with circulation, upon which nutrition depends. Without nutrition there is no repair of the body. None of these things interfere with nutrition and circulation in earlier years. The reparation of the physical system, as everyone ought to know, depends on this fine balance. In fact, the whole change is merely a slow, steady accumulation of calcareous deposits in the system. * * * When these become excessive and resist expulsion they cause the stiffness and dryness of old age. Entire blockage of the functions of the body is then a mere matter of time. The refuse matter deposited by the blood in its constant passage through the system stops the delicate and exquisite machinery which we call life. This is death. It has been proved by analysis that human blood contains compounds of lime, magnesia and iron. In the blood itself are thus contained the earth salts. In early life they are thrown off. Age has not the power to do it.

Hence, as blood is produced by assimilation of the food we eat, to this food we must look for the earthy accumulations which in time block up the system and bring on old age. * * * Almost everything we eat contains more or less of these elements for destroying life, by means of calcareous salts deposited by the all-nourishing blood. Careful selection, however, can enable us to avoid the worst of them. Earth salts abound in the cereals, and bread itself, though seemingly the most innocent of edibles, greatly assists in the deposition of calcareous matter in our bodies. Nitrogenous food abounds in this element. Hence a diet made up of fruit principally is best for people advancing in years, for the reason that, being deficient in nitrogen, the ossific deposits so much to be dreaded are more likely to be suspended. Moderate eaters have in all cases a much better chance for long life than those addicted to excesses of the table. Fruits, fish, poultry, young mutton and veal contain less of the earthy salts than other articles of food, and are therefore

* Dr. W. Kinnear, in *The Humanitarian* (Sci. Am.).

best for people entering the vale of years. Beef and old mutton usually are overcharged with salts, and should be avoided; a diet containing a minimum amount of earthy particles is most suitable to retard old age, by preserving the system from functional blockages. * * * The daily use of distilled water is, after middle life, one of the most important means of preventing secretions and the derangement of health. As to diluted phosphoric acid, it is one of the most powerful influences known to science for shielding the human system from the inconveniences of old age. Daily use of it mixed with distilled water helps to retard the approach of senility. By its affinity for oxygen the fibrous and gelatinous deposits previously alluded to are checked and their expulsion from the system hastened.

To sum up: Avoid all foods rich in the earth soils; use much fruits, especially juicy, uncooked apples, and take daily two or three tumblerfuls of distilled water with about ten or fifteen drops of diluted phosphoric acid in each glassful. Thus will our days be prolonged, old age delayed, and health insured.

PHARMACY.

CARNOSE AND NUTRIMENTOSE.—These preparations have been placed on the market in France as dietetics. In their composition they closely resemble sanose, which consists approximately of 80 per cent. of casein and 20 per cent. of albumins. (Ph. Post.)

PREPARATION OF CREOSOTE PILLS, with addition of water, has been recommended by an Italian pharmacist. The directions have been critically tested by Delhaxe, who has made the only change of reducing the quantity of water by one-half. The proportions are as follows: Creosote, 2 parts; water, 1 part, and powdered licorice root, 4 parts. The mixture makes a good mass, no creosote is lost from the pills through "sweating" and they disintegrate readily in water acidulated with hydrochloric acid. (Südd. Ap. Ztg.)

AMMONIUM PERSULPHATE is obtained by electrolysis of a saturated solution of ammonium sulphate. The crystals of persulphate separate on the anode, and have the composition NH_4SO_5 . The salt is soluble in water, but the aqueous solution is unstable, the salt changing to normal ammonium sulphate with evolution of oxygen. Ammonium persulphate is a powerful oxidizing agent, destroys organic coloring matter and oxidizes alcohol to aldehyde. It has been used in photography under the name of "anthlon." (Drog. Ztg.)

MATCHES are manufactured under the auspices of the French Government by a new process of Sévène and Cahen. They contain neither white nor red phosphorus, but phosphorus sesquisulphide. This is of yellowish color, and has a decided odor of sulphuretted hydrogen. It ignites at 35° C., while white phosphorus ignites at 60° and the red variety at 260°. At ordinary temperature it is not volatilized. The mixture is not luminous, and does not emit any vapors during the manufacture, but is odorless. (Drog. Ztg.)

"SOLID ALCOHOL" is a rather hard, moulded mass, which is readily ignited by means of a match, burning with a non-luminous flame. It is intended for heating and cooking purposes. By admixture with other substances, alcohol is converted into solid form, in which it is more suitable and convenient in many cases. According to an analysis by Dr. Aufrecht (Ph. Ztg.) it consists of about 85 per cent. of denaturated alcohol of 92 per cent. strength, and 15 per cent. of soda soap. (Zisch. Aug. Chem.)

POLYSOLVOL, or sodium sulpho-richmate, is a compound prepared by Stroink, which has the property of dissolving phenol, menthol, salicylic acid and other substances in large quantity. It is prepared by the treatment of castor oil with strong sulphuric acid and subsequently with a solution of sodium chloride. The free sulpho-richmatic acid so obtained is carefully neutralized

with sodium hydrate. The product is a thick, clear, light-yellow liquid, which must be kept in well closed bottles. It is insoluble in water, but forms a permanent, white emulsion with it. By warming on a water-bath polysolvol dissolves 30 per cent. of dry phenol, 25 per cent. of menthol, or 10 per cent. of salicylic acid. (Ph. Post.)

REMOVAL OF ODOR FROM RUBBER.—Rubber rings, disks, etc., as they are used for stoppering mineral water bottles, etc., have, when first used, a disagreeable odor, which is easily communicated to the beverages. The following methods for its removal have recently been proposed: (1) Treatment with a solution of caustic soda or potash. (2) Treatment with solutions of sodium or potassium carbonate, since the rubber is injured by the caustic alkalies. (3) Boiling with alkaline soap solutions. (4) Boiling with a solution of sodium carbonate and silicate. (5) Treatment with soda and subsequent immersion for some time in a 10 to 15 per cent. solution of sodium chloride. (Südd. Ap. Ztg.)

CEARIN is a new ointment vehicle that is capable of taking up a large proportion of water. It consists of bleached carnauba wax and paraffin. Carnauba wax cannot be bleached in the pure state, but it may be accomplished by mixing it with beeswax, Japan wax, ceresin or paraffin. The several commercial grades of white carnauba wax are not all equally adapted to pharmaceutical purposes. Those prepared with Japan or beeswax should be rejected, as they readily become rancid. For the preparation of the new ointment base Issleib recommends a mixture of one-fourth carnauba wax and three-fourths high-boiling paraffin, bleached by exposure to sunlight only. This is fused and mixed with four times its weight of liquid paraffin (sp. gr., 0.88), and the mixture stirred until cold. It is capable of taking up 15 per cent. of water. (Drog. Ztg.)

PREPARATION OF ARTIFICIAL SERUM.—Triollet gives the following method: When red blood corpuscles, deprived by centrifugal force of their natural serum, are added to solutions of 0.1 to 0.6 per cent. sodium chloride, it will be seen under the microscope that they swell up and finally burst. The hemoglobin then goes into solution, the more rapidly, the smaller the quantity of salt in solution. In presence of 0.7 per cent. of salt, the blood corpuscles remain intact and the hemoglobin does not go into solution. With still larger quantities of salt the effect is reversed, the corpuscles shrink. A 0.7 per cent. solution of salt is, therefore, the only strength admissible. Sodium chloride is the most suitable salt for the purpose. Others that may be used are, in the order of their desirability, sodium bicarbonate, sulphate and phosphate, and magnesium sulphate. (Südd. Ap. Ztg.)

A USEFUL BEETLE.—Entomologists are interested in the shipments made by Dr. Howard, Entomologist of the United States Department of Agriculture, of beetles to the Department of Agriculture, Portugal. The beetle is known as the *Novius cardinalis*. Its home is in Australia, and it was introduced in California several years ago by the Board of Horticulture of that State. It was hoped it would prey upon the white or fluted scale, which was ravaging the orange groves of California at that time. A similar case has occurred in Portugal, and the Portuguese authorities asked the United States authorities to aid them in exterminating the insects, which were destroying the orange and lemon groves along the River Tagus. Dr. Howard secured about sixty specimens from California, with some larvae. They were packed in moss, with a quantity of the scale insects, and they were shipped by mail to Portugal. Only five of the beetles survived the trip, and another colony was obtained from California, and was forwarded by direct steamship to Lisbon. One male and five females survived. These beetles are noted for their fecundity, and within a few months their progeny numbered thousands. These were distributed to work upon the scale bugs. The latest advices from Washington indicate that the beetles now number millions and are rapidly ridding the country of the pest. This is only another instance of the good work which this important department of the government is performing. (Sci. Am.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Acetic Fluid Extract White Pine Compound.

(E. R. A.) Data are wanting regarding the preparation of a compound fluid extract of white pine with acetic acid as a menstruum. How perfectly such a menstruum will remove the medicinal constituents of the crude drugs employed we are unable to state. May be some reader has done some practical experimenting along this line, and will report his results.

Explosive or "Trick" Cigars.

(E. R. B.) We are told that a small quantity of saltpetre and charcoal, or lycopodium introduced into the cigar will do the "trick." Other non-poisonous combinations may be suggested, though it will doubtless be much more satisfactory to purchase the cigars already "loaded." Dealers in theatrical supplies and novelties can supply them. The propriety of playing jokes of this character is questionable, for the most daring joker cannot well afford to overlook the element of danger and possible cruelty connected with a successful display of this kind of joking. It is too barbarous.

Experiments with Phosphorus.

(F. S. P.) A solution of phosphorus in carbon disulphide, when allowed to evaporate upon a piece of blotting paper, leaves the element in so finely divided a condition that its rapid oxidation almost immediately raises the temperature to the ignition point of the phosphorus, when it takes fire. This experiment was probably performed by your friend. The act of breathing upon the paper painted with the solution may have slightly assisted evaporation of the solvent, and thus hastened oxidation of the phosphorus. The rapid oxidation of the phosphorus caused its ignition.

Liquor Carbonis Detergens.

(W. R. B.) The following formula is that generally used by physicians in this country:

Coal tar 4 ounces
Tincture quillaja, N. F. 8 fl. ounces
Alcohol 8 fl. ounces

Digest for two days, decant and filter. Under the title "Liquor Picis Carbonis" a similar formula is offered in the British Unofficial Formulary. It follows:

Prepared coal tar 4 ounces
Tincture quillaja 1 pint

Digest at a temperature of 120° F. for two days, allow to become cold, and decant and filter. Prepared coal tar, or "Pix Carbonis Liquida Preparata," is made from commercial coal tar by placing it in a shallow vessel and heating at a temperature of 120° for one hour, stirring frequently.

Chrysarobin.

(F. S. P.) Chrysarobin is a neutral principle extracted from Goa powder, a substance found deposited in the wood of *Andira Araroba*, a full description of which may be found in the *Pharmacopœia*. It is largely used in the preparation of chrysarobanic acid, which it contains in greater or less quantities, and as a local remedy for parasitic skin diseases. It is frequently employed as a remedy for psoriasis and chronic eczema, by being rubbed up with water into a dough, which is spread over the diseased spot, after it is, as far as possible, freed from scales by washing. After drying, the dough is covered with a layer of collodion or solution of gutta-percha, and the whole allowed to remain for several days, when it is removed by washing and renewed. Consult the dispensatory or some standard work on therapeutics.

Phenylene-Diamine.

(F. S. P.) Phenylene-diamine is obtained from metadinitro benzene by reduction. Three isomeric varieties exist, the meta and para forms and some of their salts being used in the color industry and as tests in analysis. By the action of nitrous acid upon meta-phenylene-diamine, a yellowish-brown azo dyestuff, known as Bismarck brown, is formed, and the para-diamine, when reduced with hydrogen sulphide and then oxidized, yields violet or blue sulphur-containing dyestuffs of the methylene blue class. Metaphenylene diamine occurs in crystals, melting at 63° C. and boiling at 276° C. It is difficultly soluble in water and easily soluble in alcohol and ether. This compound and the hydrochlorate of meta-phenylene-diamine have been used as tests for nitric acid and nitrites in water. Phenylene-diamine, the meta form, is listed at \$2 per ounce, and the para form at \$1.50 per ounce.

Mercuric Chloride and Lime Water.

(J. H. B.) asks how to compound the following:

Mercuric chloride 8 grains
Glycerine 1 ounce
Nitric acid 24 minims
Lime water, to make 16 fl. ounces

Dissolve the mercuric chloride in the glycerin and then add the lime water. After shaking thoroughly, add the nitric acid. Several reactions may occur, each depending upon the order of bringing the ingredients together. Certain organic substances, such as glycerin, acacia, sugar, etc., have the property of retarding or preventing the precipitation of solutions of some of the metallic salts by solution of lime and the alkalis. In the above prescription the complete precipitation of the mercury is retarded by the glycerin. The formula is a modification of the yellow mercurial lotion of the National Formulary. The nitric acid unites with the lime to form a nitrate. The mixture is probably intended for veterinary use, and should be sent out under a "shake" label.

Elixir Lactated Pepsin.

(A. G. A.) The National Formulary, revised edition, affords a formula for a preparation containing pepsin with lactic acid. See that work, page 22 (Compound Digestive Elixir). Another formula is the following from Griffith's "Non-Secret Formulas":

Pepsin, pure 80 grains
Pancreatin 40 grains
Diatase of pyralin 10 grains
Cudbear, powdered 150 grains
Dilute hydrochloric acid 20 minims
Lactic acid 3 drops
Alcohol 3 fl. ounces
Water 7 fl. ounces
Simple syrup 6 fl. ounces

Mix all the above except the syrup, macerate for three days, agitating frequently; filter, to the filtrate add the syrup, and then through the filter add enough of a mixture of alcohol and water, in the proportion of 5 to 7 by measure, to make the liquid measure 16 fluid ounces.

See also Era of August 14, 1898, page 150.

Benzoinated Almond Cream.

(B. F. J.) Almost any preparation of almond cream containing benzoin or tincture of benzoin might properly be classed under the above caption, and any of the preparations whose formulas appear in this journal October 27, 1898, page 574, may be "benzoinated" by the addition of a small quantity of tincture of benzoin. Here is another formula in which benzoinated lard is employed:

Oil sweet almond 6 1/2 fl. ounces
Castor oil 1 1/2 fl. ounces
Benzoinated lard 2 av. ounces
White wax 2 av. ounces
Rose water 3 fl. ounces
Orange flower water 2 fl. ounces
Oil rose 4 drops
Essence jasmine 1 1/2 fl. drams
Essence cassie 1 fl. dram
Powdered borax 1/2 ounce
Glycerine 1 fl. ounce

Melt the oil of sweet almond, wax and lard together and stir in the castor oil; make a solution of the borax in the glycerine and rose and orange flower waters and incorporate in the usual manner. Finally add the oil of rose and the essences, and stir until cold.

Sulphuric Acid and Oils.

(J. H. B.) The following formula is a type of the so-called "spavin cures," and a more incompatible and possibly dangerous mixture can hardly be devised.

Gum euphorbium,	
Powdered cantharides,	
Mercuric chloride,	2 drams
Tartar emetic, of each,	½ ounce
Mercurial ointment	½ ounce
Turpentine,	
Oil of spike, of each,	3 ounces
Oil wormwood	½ ounce
Oil cedar	½ ounce
Crude oil	2½ ounces
Sulphuric acid	1 ounce

Sulphuric acid reacts violently with oils and introduces an element of danger to the compounder in putting up this mixture. Horse doctors and others will have it, however, and you may compound it by mixing all of the ingredients except the sulphuric acid in the usual manner. The mixture should then be removed out of doors, and the sulphuric acid added in very small quantities, stirring and cooling after each addition. The operation should be conducted in a comparatively large vessel, care being taken while adding the acid to keep the eyes and face turned away from the mixture.

Prize Elixir.

(A. G. A.) This formula was published in the January 3, 1895, Era, but as that issue is out of print, we repeat it here:

Oil orange (fresh)	96	minims
Oil lemon	24	minims
Oil coriander	6	minims
Tincture vanilla, U. S. P.	2	fl. ounces
Tincture cardamom, simple	2	fl. ounces
Powdered chocolate (Hance's)	2	fl. ounces
Baker's	2	fl. ounces
Alcohol	32	fl. ounces
Syrup, simple	48	fl. ounces
Water (filtered through charcoal)		
enough to make	1	gallon

Filter and clarify with purified talcum.

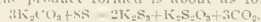
(1) Dissolve the oils in 8 fluid ounces of alcohol, add 24 fluid ounces water and the balance of the alcohol; shake well.

(2) Dissolve chocolate in 6 ounces hot water, add the syrup, shake well, add the tinctures of cardamom and vanilla, and enough water to make one gallon. Filter through paper, on which about one ounce talcum has been distributed; return the first part until the filtrate is clear.

For additional remarks on the preparation of this elixir see this journal, March 28, 1895, page 398.

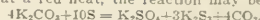
Preparation of Potassium Sulphuret.

(C. E. W.) Practically the preparation on a commercial scale of potassium sulphuret does not differ from the process given in the Pharmacopœia, viz., heating together in a covered crucible, sublimed sulphur 1 part, and potassium carbonate 2 parts. The heating is continued until the mixture ceases to swell and is completely melted. The liquid is then poured on a marble slab, and after it has solidified and become cold it is broken into pieces and kept in well stoppered bottles. It is reported that some manufacturers employ potassium carbonate obtained from pearlsh in making this substance, otherwise the details of the process are the same as outlined in the official process. M. Henry's process, quoted by the United States Dispensatory and stated to be the best yet devised, makes use of pure potassium carbonate. The formula is as follows: Mix two parts of potassium carbonate with one of sulphur reduced to powder, and put the mixture into flat-bottomed matrasses, which should be only two-thirds full. These are placed on a sand-bath, and the fire is applied so as, at first, to produce only a gentle heat, which is afterwards increased. Care must be taken that the necks of the matrasses do not become obstructed. The heat is continued until the mixture is brought to a state of tranquil fusion, when it is allowed to cool and the mass obtained is broken into pieces in the usual manner. With the proportions given in the official formula, and if the temperature is not too high, the product formed is about as follows:



The composition of potassium sulphuret (sulphurated potassa) varies with the heat employed. Thus, in the British Pharmacopœia, which directs the fusion to be

conducted at a red heat, the reaction may be written:

**Quinine and Water of Ammonia.**

(H. P. C.) asks why water of ammonia precipitated the quinine in the following formula:

Iron pyrophosphate	256	grains
Quinine sulphate	128	grains
Strychnine sulphate	14	grains
Citric acid	128	grains
Alcohol	3	ounces
Spirit orange	14	drams
Simple syrup	6	ounces
Water	7	ounces
Water of ammonia	q. s.	

Mix the acid, quinine and strychnine sulphates and add the alcohol and spirit of orange. To this mixture add the syrup, heated to about 150° F., and stir until clear. Dissolve the iron pyrophosphate in the water and add to the first mixture; then add water of ammonia drop by drop until clear.

Ammonia precipitates alkaloids from their solutions, and the precipitation of quinine and strychnine is no exception to this general rule. We think too much water of ammonia was added, and so soon as the mixture became alkaline, the alkaloids were thrown down. Water of ammonia is not really needed in the formula, though its introduction is probably due to an attempt to produce a more soluble pyrophosphate of iron by the formation of ammonium citrate with the citric acid. This formula is very similar to one published in the fourth edition of the National Dispensatory (1886) for elixir pyrophosphate of iron, quinine and strychnine. The formula contains no water of ammonia, and before the advent of the National Formulary, it was a favorite process for preparing this elixir. It is as follows: Dissolve 256 grains of pyrophosphate of iron in 4 fluid ounces of distilled water, and add 6 fluid ounces of syrup and a solution of 2½ grains of strychnine and 128 grains of quinine in 5½ fluid ounces of alcohol and ½ fluid ounce of spirit of orange. This formula and that of our correspondent possess no advantages over the elixir of phosphates of iron, quinine and strychnine of the National Formulary, which, for the sake of uniformity, should be followed.

Composition Powder.

(J. H. B.) We are not familiar with the formula under the name you give. There are many modifications of the formula for the old Thompsonian "Composition Powder" extant, the one most used, perhaps, being the compound powder of bayberry, or composition powder, of the National Formulary. Here are some other formulas from the older "botanic" writers, the first said to be the original Thompsonian formula:

Bayberry	2 pounds
Hemlock, inner bark	1 pound
Ginger	1 pound
Cayenne	2 ounces
Cloves	2 ounces

Dr. Elias Smith's Formula.

Bayberry	1 pound
Hemlock bark	8 ounces
Witchhazel leaves	4 ounces
Ginger	8 ounces
Cayenne	4 ounces
Cloves	2 ounces

Dr. J. T. Wells Formula.

Xanthoxylon (?)	1 dram
Ginger	3 drams
Valerian root	3 drams
Blue cohosh	5 drams
Black root (depandra)	5 drams
Golden seal	5 drams
Pleurisy root	10 drams

Dr. J. Everett's Formula.

Bayberry	3 pounds
Ginger	2 pounds
Caraway seed	2 pounds
Cloves	8 ounces
Sassafras, bark of root	4 ounces
Cayenne	4 ounces

Formula from Howard's "Domestic Medicine."

Butterfly root	1 pound
Bayberry, bark of root	1 pound
Sassafras	4 ounces
Colic root (Liatris Spicata)	4 ounces
Ginger	1 pound
Cloves	2 ounces
Cayenne	2 ounces

All these pulverized and sifted through a fine sieve and well mixed; dose, for an adult, one teaspoonful in hot water; sweetened if most agreeable.

The Era Course in Pharmacy.

CONTRIBUTORS

Elias H. Bartley, M.D., Ph.G.
Emil L. Boerner, Ph.D.
Virgil Coblenz, A.M., Ph.D.
Wilber C. Compher, A.M., Ph.D.
D. M. R. Culbreth, M.D.
Albert E. Ebert, Ph.M., Ph.D.
E. E. Ewell, Ph.C.
James M. Good, Ph.G., M.D.
Arthur L. Green, M.D., Ph.D.
Charles F. Heehner, Ph.M., Ph.G.
George B. Kaufman, B.Sc., Ph.D.
E. J. Kennedy, Ph.C.
Henry Kraemer, Ph.G., Ph.D.
Edward Kremers, Ph.G., Ph.D.
John Uri Lloyd, Ph.M., Ph.D.

J. H. BEAL, Sc.D., Ph.G., Director.
CHARLES W. PARSONS, Ph.C.

The Era Course in Pharmacy consists of a two years' graded course of lectures for the Home Study of Pharmacy, published weekly in the Pharmaceutical Era. Quizzes and examinations conducted by mail. Junior and Senior Classes each year for 36 weeks, from September to May. Tuition Fee, \$8 per annum complete.

CONTRIBUTORS

Stewart Leroy McCurdy, A.M., M.D.
Joseph E. Morrison.
Oscar Oldberg, Ph.D.
George F. Payne, Ph.G., M.D.
Edgar L. Patch, Ph.G.
T. D. Reed, M.D., C.M.
Edsel A. Ruddiman, Ph.M., M.D.
Henry H. Rusby, M.D.
Samuel P. Sadtler, Ph.D.
L. E. Sayre, B.Sc., Ph.M.
Wilbur L. Scoville, Ph.G.
William Simon, Ph.D., M.D.
F. E. Stewart, M.D., Ph.G.
Julius W. Sturmer, Ph.G.
Frederick J. Wulling, Ph.G., Ph.M.D.

JUNIOR COURSE. LECTURE No. 27.

Inorganic Chemistry.

BISMUTH.

Symbol, Bi Atomic Weight, 206.58. Valence, 3,5.
Specific Gravity, 9.823.

Historical.—Bismuth seems to have been first distinctly pointed out as a separate metal in the "Last Testament," a work published in the fifteenth century, and the authorship of which is attributed to Basil Valentine. By the later alchemists it was frequently confounded with antimony and also with zinc, and it was not until 1739 that the metal was carefully studied and described by Pott. Its reactions were first fully investigated by Bergman near the close of the last century. The name of the element is probably derived from the German "Wismuth," applied by the miners to the native metal.

Natural Occurrence.—Bismuth occurs mainly in the free state, but is found also as the trioxid, or bismuth ochre, Bi_2O_3 , the trisulfid, and to some extent combined with tellurium, copper and lead. The principal sources are Australia, South America and Europe.

Preparation.—When it occurs in the free state it is separated from the earthy impurities by simply melting and pouring off from the infusible matter. Its ores may be reduced by roasting and heating with carbon, as in the reduction of antimony. Nearly all commercial bismuth contains arsenic, from which it must be freed before it can be used pharmaceutically.

Physical Characters.—Bismuth is a hard, brittle, white metal, having a brilliant luster and a distinct pinkish tinge. Its specific gravity is 9.823. It fuses at 270° , and can be distilled at high temperatures. Its crystalline form is that of an obtuse rhombohedron, resembling a cube.

Chemical Properties.—In perfectly dry air its luster is permanent, but in the presence of moisture it slowly becomes covered with a thin film of oxid. It does not decompose water at ordinary temperatures, but at a red heat decomposes steam. It is insoluble in hydrochloric and in cold sulfuric acids. Hot sulfuric acid dissolves it with evolution of sulfur dioxide. It is readily soluble in both nitric and nitro-hydrochloric acids.

Uses of the Free Element.—Like antimony, bismuth expands at the moment of solidification, thus taking a sharp impression of the lines of the mold in which it is cast. It is used in the manufacture of stereotype metal and in the production of fusible alloys. One of the latter, known as Wood's metal, consisting of bismuth 4 parts, lead 2 parts and 1 part each of tin and cadmium, fuses at 60.5° , a point much lower than the melting point of its most fusible constituent.

Compounds of Bismuth.

No hydrogen compound of bismuth is known.

Halogen Compounds.—The halogen compounds of bismuth are instable in the presence of water, like the corresponding antimony salts, decomposing to form basic compounds. These contain the univalent radical BiO , known as bismuthyl.



The haloid salts of bismuth, as far as known, are a trifluorid, BiF_3 ; trichlorid, BiCl_3 , and a tetrachlorid, Bi_2Cl_4 ; a tri- and tetra bromid, BiBr_3 , Bi_2Br_4 , and a tri-iodid BiI_3 . The last is the most stable of the series. No pentahalid, as BiCl_5 , has as yet been prepared.

Oxygen Compounds.—Bismuth forms four oxids, monoxid, Bi_2O ; Bi_2O_2 ; trioxid, Bi_2O_3 ; tetroxid, Bi_2O_4 , and pentoxid, Bi_2O_5 .

The trioxid corresponds to the bismuthous salts. It is found native as bismuth ochre, and is produced artificially by heating the hydroxid, carbonate or nitrate, or by burning the metal at a high red heat. The other oxids are unimportant.

Sulfur Compounds.—The principal compound of bismuth with sulfur is the trisulfid, Bi_2S_3 . It exists native as bismuthite or bismuth glance, and may be produced artificially by fusing bismuth with sulfur, or by precipitating its salts with hydrogen sulfid. When formed in the latter manner it is a brown-black powder, insoluble in alkalis or alkaline sulfids, soluble in nitric acid.

Other Important Compounds.—Other bismuth compounds of importance are the trinitrate, the basic nitrate and the basic carbonate.

The *Trinitrate* or *Bismuthous nitrate*, $\text{Bi}(\text{NO}_3)_3$, is obtained when the metal or its hydroxid or carbonate is dissolved in nitric acid. If this solution is poured into an excess of water, the basic nitrate or *subnitrate*, is precipitated. The composition of the precipitate varies with the degree of acidulation, probably the most common form being $\text{BiONO}_3 \cdot \text{H}_2\text{O}$.



Bismuth subcarbonate, $\text{Bi}_2\text{O}_3\text{CO}_2$, is precipitated from bismuthous solutions by soluble carbonates. The subnitrate and subcarbonate are both official.

Uses of Bismuth Compounds.—Bismuth trioxid is used instead of lead to make a glass of higher refractive index than flint glass. The oxid and subnitrate are employed to give an iridescent colorless glaze for porcelain. Compounded with various preparations of gold, it yields various colored glazes, ranging from violet-red to copper color, with golden lusters.

The subnitrate and subcarbonate are sometimes employed as cosmetics. The cosmetic known as *pearl white* is a specially prepared and purified bismuth oxychlorid. Both salts are also much used internally as gastric sedatives. When required for this purpose they should

be entirely free from arsenic to the presence of which impurity the occasional untoward effects of bismuth salts have generally been attributed.

Characteristic Reactions.—Solid bismuth compounds mixed with sodium carbonate and heated on charcoal before the blow-pipe yield brittle globules of metallic bismuth, surrounded by an incrustation which is brown-yellow while hot and lemon yellow when cold. The outer edge of the incrustation is encircled by a bluish-white border. Mixed with powdered sulfur and potassium iodid, and heated on charcoal, bismuth compounds yield a scarlet incrustation of bismuthous iodid.

Solutions of bismuth salts, not too acid, yield white precipitates of basic salt when added to an excess of water. With hydrogen sulfid and alkaline sulfids, brownish-black bismuth sulfids are formed, not soluble in excess. Alkaline hydroxids precipitate white bismuthous hydroxid, $\text{Bi}(\text{OH})_3$, not soluble in excess. In slightly acidulated solutions, potassium iodid precipitates brown bismuthous iodid, soluble in excess of the reagent. Solutions of chromates and dichromates precipitate from bismuthous salt the yellow basic bismuth chromate, $\text{Bi}_2\text{O}(\text{CrO}_4)_2$.
 $2\text{Bi}(\text{NO}_3)_3 + 2\text{K}_2\text{CrO}_4 + \text{H}_2\text{O} = \text{Bi}_2\text{O}(\text{CrO}_4)_2 + 4\text{KNO}_3 + 2\text{HNO}_3$

Review of the Nitrogen Group.—As in the two groups previously studied, we have noticed in the present one a marked relation existing between the properties of the elements and their atomic weights. Nitrogen with the lowest atomic weight has the lowest specific gravity, and is distinctly a non-metal. In phosphorus there is an increase in specific gravity, while the element is in some respects less non-metallic than nitrogen. Arsenic, which stands at the middle of the group, stands also on the boundary line between the metals and non-metals, partaking almost equally of the characters of both. Antimony, with a higher atomic weight, has also a higher specific gravity, and is distinctly a metal, although of feeble basic powers, and exhibiting a marked tendency to assume an acid character toward the stronger bases. The last member, bismuth, along with its high atomic weight, possesses the highest specific gravity in the group, and is a very pronounced metal, its most marked resemblance to non-metallic qualities being the ready decomposability of its halogen compounds by water.

A comparison of the hydrogen compounds of the group is also instructive. Beginning with ammonia we have a very strong and stable base. Phosphin is less basic, and less stable, arsen still less so, and stibin least of all, while bismuth does not form even an unstable compound with hydrogen.

THE CARBON FAMILY.

CARBON, SILICON, GERMANIUM, TIN, LEAD.

The student who has carefully followed the preceding lectures on the elements will not have failed to notice the following facts:

1. That the halogens are all decided non-metals, but that their non-metallic qualities become less marked as we pass from fluorin to iodin, or as the atomic weight rises. Also that the valence toward hydrogen is *one*, as in HF , HCl , HBr and HI . These hydrogen compounds are all powerful acids, the last being the feeblest.

2. That the elements of the oxygen family are less non-metallic as a whole than the halogens, the last member (tellurium) possessing some marked metallic qualities. It is also noted that the hydrogen valence of this family is *two*, as in H_2O , H_2S , H_2Se and H_2Te . The first of these, water, is a neutral compound, the other three are weak acids.

3. That the nitrogen family, as a whole, presents a marked advance towards metallicity over the two preceding groups. The first two only are typical non-metals, the third is of an indeterminate character, while the last two are very decided metals. In this group the hydrogen valence is *three*, as seen in NH_3 , PH_3 , AsH_3 and SbH_3 . The first of these, ammonia, is a strong base, phosphin is a feeble base, while the others are almost without basic properties.

In the carbon family the same advance in properties continues. The first two only are non-metals, while the

others are metals of a very pronounced character the last two possessing the quality of malleability. The hydrogen valence of the first two elements is *four*, as in CH_4 and SiH_4 . This is the maximum valence toward hydrogen that is possessed by any element. The last three members of the family are not known to combine with hydrogen in any case.

All the elements of this family form dioxids. Those of carbon, silicon and germanium are acid anhydrids. Tin dioxid can act as an acid anhydrid toward stronger bases, and as a basic anhydrid with stronger acids. Lead dioxid has feeble acid properties.

CARBON.

Symbol C. Valence, 2, 4. Atomic Weight, 11.9. Specific Gravity, 2.01 to 3.6.

Historical.—The several natural forms of carbon have been known for ages, but the element was not clearly recognized as one of the simple substances of nature until near the close of the last century. The proof of the identity of the element in its several natural forms was not clearly established until after the experiments of Smithson Tennant in 1796, and of Mackenzie in 1840.

The name of the element is derived from *carbo*, the Latin equivalent for coal, or charcoal.

Natural Occurrence.—Free carbon occurs in nature in three allotropic forms, as diamond and graphite, both crystalline, and in the amorphous condition, as coal. Combined, it exists in vast quantities in the carbon dioxid of the atmosphere, and in the mineral carbonates. Of these the most abundant is calcium carbonate, found as chalk, limestone and marble, and a double carbonate of calcium and magnesium known as dolomite. Among other metals zinc, copper, barium and iron also frequently occur as carbonates.

Carbon is an essential constituent of all organic structures, both animal and vegetable, and is the element left behind as charcoal or coke when these substances are heated out of contact with air.

The amorphous form of natural carbon is found in the several varieties of coal, which substance is the result of the decomposition of organic matters, mainly vegetable, while buried beneath earth and water. When allowed to decay in air the carbon of vegetable matter combines with the atmospheric oxygen and passes off as carbon dioxid, but when the change takes place beneath water oxygen is excluded and the carbon is left behind as an amorphous mass. The first step in the transformation is known as *peat*, the next as *brown coal* or *lignite*, the third as *bituminous coal*, and the last as *anthracite*. The greater the age of the coal bed, and the greater the pressure to which it has been subjected, the more complete the transformation and the more compact the variety of coal produced. In the passage from *peat* to *anthracite* there is a gradual decrease in the per cent. of gaseous constituents, and a consequent increase in the per cent. of solid carbon and mineral substances.

Preparation.—The most important forms of artificial carbon are lamp black, animal and wood charcoal, coke and gas carbon. Their preparation for use in the arts constitutes several of the most important industries. All of these forms are amorphous.

Lamp black is prepared by burning oils, or other sub-

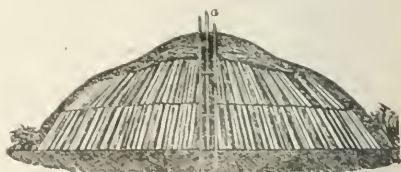


Fig. 39.—Charcoal Stack.

stances rich in carbon, with an insufficient supply of air, and collecting the resulting "soot" in suitable chambers.

By the old method of manufacture wood charcoal is produced by stacking wood in piles, covering with sods and lighting. After the combustion is sufficiently under way, the further ingress of air is shut off, and the pile allowed to smoulder. (Fig. 39.) The water and other

volatile constituents of the wood are driven off by the heat of the mass and the solid carbon is left behind as a black solid, which preserves the grain of the wood, and gives forth a metallic sound when struck. In the more modern method of manufacture, the wood is subjected to destructive distillation in closed retorts, thus permitting the valuable by-products, tar, acetic acid, methyl alcohol, combustible gases, etc., to be collected and saved.

When animal matters, as blood, bones, etc., are subjected to carbonization, the product is known as animal charcoal, or the finer qualities, as bone or ivory black.

All varieties of charcoal, but more especially that produced from animal matter, has the property of readily absorbing and condensing within its pores many gaseous substances, alkaloids, metallic salts and coloring matters. Immense quantities of animal charcoal are used for the purpose of removing the coloring matter of sugar in the process of refining.

Coke is virtually a mineral charcoal, prepared by the carbonization of bituminous coals in kilns known as "coke ovens." The mass, being set on fire, is permitted to burn for some time, when the further supply of air is cut off, and the carbonization completed by the heat already generated. By this wasteful method all the valuable products, as tar, ammonia and combustible gases, are given off into the atmosphere and wasted. Lately more improved processes have begun to be adopted whereby many of these substances may be saved. Considerable quantities of coke are also produced as a by-product in the manufacture of illuminating gas.

Gas carbon is a hard and compact variety of carbon deposited in the retorts of gas works from the decomposition of the gaseous hydrocarbons produced from the coal.

It is employed in the manufacture of the carbon rods used in arc lamps, for the negative plates of voltaic batteries, etc.

PRACTICAL STUDIES.

(1) Mix bismuth subnitrate or subcarbonate with an equal quantity of sodium carbonate and heat on charcoal before the blow-pipe. If a metallic bead is produced, is it soft and malleable or hard and brittle? Is there an incrustation? Does the color change on cooling?

(2) Mix equal proportions of a solid bismuth compound, sulfur and powdered potassium iodide and heat on charcoal before the blow-pipe. What is the result?

(3) Dissolve some bismuth subcarbonate or subnitrate in nitric or hydrochloric acid, using no more acid than is necessary. What is the reaction, and what is probably produced? Add a few drops of the clear solution to a test tube full of water, and note result. Represent by means of an equation.

(4) Dilute some of the acid solution (a precipitate, if produced, does not interfere with the result), and add either hydrogen sulfide or ammonium sulfide, diluted with ammonia water. What takes place? Write the equation.

(5) To a fresh portion of the dilute solution add ammonium or potassium hydroxide solution. What occurs? Write the equation.

(6) To another portion of the dilute solution add solution of potassium chromate or dichromate. What occurs?

(7) To another portion of the dilute solution add potassium iodide solution. If a precipitate is formed, note its color. Pour off the supernatant liquid, and to a small portion of the precipitate add more potassium iodide. Is it soluble or insoluble in the excess?

JUNIOR COURSE. LECTURE No. 28.

Pharmaceutical Physics.

Magnetism.

Natural and Artificial Magnets.—Since very early times it has been known that a certain heavy, black, mineral had the power of attracting small pieces of iron, and of assuming a north and south direction when suspended freely in the air. To this mineral, a peculiar oxid of iron, the Greeks gave the name *Magnes*, probably from Magnesia, the title of an ancient city of Asia Minor near where the substance was first obtained. The old English name for this natural magnet was lodestone, which was derived from a still older Anglo-Saxon word, meaning to lead or draw.

Artificial magnets are pieces of iron or steel which have been made magnetic by passing an electric current around them, or by bringing them in contact with a natural magnet, or with another artificial magnet previously prepared in one of these ways.

Artificial magnets made of soft iron lose their magnetism as soon as the influence of the electric current or other magnet is withdrawn, and are therefore denominated *temporary magnets* to distinguish them from the permanent magnets which are made of hardened steel.

Temporary magnets are known as *electro-magnets* when created by the action of electric currents on soft iron.

Polarity of Magnets.—A magnet suspended so that it can turn freely, as a compass needle, takes a position pointing approximately north and south. If the magnet be turned around until the north end points south, it will immediately reverse itself on being released, showing that one end only is attracted to the north and the other to the south. If the magnet be dipped into fine iron filings, the latter will arrange themselves in radiating bunches at each end, while none are attracted at the middle portion. (Fig. 89.)

Because of these and similar phenomena, a magnet is said to possess "polarity," and its two attracting ends are known as "poles."

These two poles are inseparable from a magnet. If a large magnet be broken into pieces, each one of its fragments is found to also possess two poles; and if these small magnets be reunited, their intermediate poles disappear and the two original poles reappear.

Since the smallest particles into which a permanent magnet can be divided possess polarity, it is assumed that the individual molecules also possess poles, and are, in fact, complete magnets.

In order to distinguish between the two ends of a magnet, it has been customary to call that pole which points north the north pole, and the other the south pole; but, as will be seen later, this leads to an inconsistency in naming the magnetic poles of the earth. For this reason it is perhaps better to term the north seeking end the + or positive pole, and the other the — or negative pole.

Magnetic Transparency.—If a magnet be held on one side of a sheet of glass and a nail or other piece of iron be brought close to the other side, it will stick fast, and can be made to follow the pole of the magnet; as the latter is moved about. A thin board, book, or any other non-magnetizable substance can be substituted for the glass with the same result. It thus appears that a magnet can act through non-magnetic matter, or that such matter is transparent to the magnetic force.

If the interposed body be of magnetizable material it will itself be affected by the magnet, but will prevent the latter from acting through it.

Magnetic Induction.—If a nail or piece of soft iron be tested while it is attracted by a magnet either directly or through some other medium, it will be found to have acquired magnetic properties, which will continue as long as it is subject to the influence of the attracting magnet. When the latter is withdrawn, the nail loses its magnetism, unless it should be of steel, when, of course, it would remain a permanent magnet. A magnet formed in this way is known as an *induced magnet*, and the process as *induction*.

As it is difficult to understand how one body could act upon another across absolutely empty space, it is believed



Fig. 89.—Bar Magnet and Iron Filings, themselves in radiating bunches at each end, while none are attracted at the middle portion. (Fig. 89.)

that the medium through which this influence is exerted is the ether, or in other words, that the molecules of a magnet create a stress in the ether surrounding them, and that through the ether this stress is communicated to the molecules of magnetizable substances when the latter are brought within the magnetic field.

Law of Like and Unlike Poles.—If two magnets are freely suspended by threads, and their positive poles are brought together, repulsion will follow and the two magnets will be pushed apart. The same result is produced when their two negative poles are brought near each other. If, however, the positive pole of one be brought near the negative pole of the other, attraction will follow, and not repulsion. From these facts is deduced the so-called First Law of Magnets, that *like poles repel, and unlike poles attract each other*.

Forms of Magnets.—Magnets may have any form, though the two most common are the straight bar, and the U shaped. The advantage of the latter is that both poles are thus able to exert their attractive powers upon the same object at the same time, and also that they so strengthen each other by mutual induction that a magnet of this form is able to lift a load three or four times as great as a bar magnet of the same weight.

It is found by experiment that the magnetism of a piece of steel does not penetrate very deeply beneath the surface, so that where a very strong permanent magnet is desired, it is better to magnetize thin strips of steel and afterwards bolt them together. (Fig. 90.) Such a combination is termed a *compound magnet*.

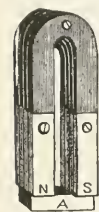


Fig. 90.—Compound Horseshoe Magnet.

When not in use it is customary to keep a piece of soft iron called a keeper or armature attached to the poles of a permanent magnet, to hold or bind its magnetism.

Permanent magnets may have their magnetism lessened or destroyed in various ways: by being left without armature, by lying with the + pole pointing south, by jarring or hammering, by heating, etc.

The most powerful magnets are electromagnets, made of soft iron, and surrounded by coils of wire through which strong electric currents are passed. These are, of course, temporary magnets, and are an essential part of the machinery employed in the generation or utilization of the electric current on a large scale.

Lines of Magnetic Force.—If fine iron filings are sifted on to a piece of glass covering a magnet and the glass be then gently tapped, the filings will arrange themselves in curved lines radiating from one pole to the other. (Fig. 91.) If a sewing needle be rendered magnetic and

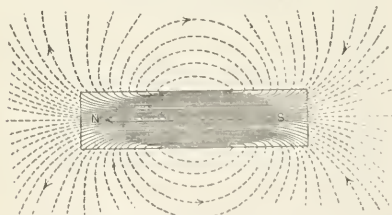


Fig. 91.—Diagram of Lines of Force.

suspended by a light thread and held over the glass, it will everywhere tend to place itself parallel with the rows of filings. These lines are known as *lines of force*, and extend in every direction from each pole, showing that each is surrounded by a sphere-like region, or *field*, of magnetic force.

This representation of the magnetic field may be made permanent if the plate of glass be covered with a thin film of paraffin before the filings are scattered thereon. If after the latter have arranged themselves in curves the plate be slowly warmed, the filings will sink into the film, and will be permanently fixed when the film resolidifies.

The Second Law of Magnets.—Since the lines of force radiate in all directions, it might be suspected that the law of inverse squares would apply. That this is the case, appears from the second law of magnets which is,

that the attractive force between two magnetic poles varies directly as the product of their respective strengths, and inversely as the square of the distance between them. Doubling or trebling the strength of one of the magnets, doubles or trebles the force of their attraction; doubling or trebling their distance apart reduces their attraction to one-fourth or to one-ninth, etc.

Diamagnetism and Paramagnetism.—Besides iron, only nickel and cobalt are sufficiently susceptible to magnetic attraction to be influenced perceptibly by magnets of ordinary powers. With the aid of sufficiently powerful electro-magnets, however, it can be shown that nearly all substances, and possibly all, are susceptible to a greater or less extent to magnetic influence. Some, like iron, nickel, and cobalt, arrange themselves axially between the poles of a U magnet, and are known as *paramagnetic*. Others, like bismuth and oxygen, arrange themselves with their longer axis at right angles between the poles, and are said to be *diamagnetic*.

Ampere's Theory of Magnetism.—The theory of Ampere assumes that about every molecule of a magnetizable body there is a current of electricity circulating continuously and without resistance, in consequence of which each molecule must be a magnet. In an unmagnetized bar, however, the molecules are arranged promiscuously, so that their currents oppose each other and their magnetic effect is neutralized. When a strong current is sent around the bar, or when the latter is subjected to the inductive action of a magnet, the molecules are pulled into such positions that the currents about them are rendered parallel, when the bar becomes a magnet.

If the bar is of steel, its molecules retain their parallelism after the inductive force is withdrawn, but if it is of soft iron, the molecules slip back into their old position, and the magnetism of the bar disappears. It is in consequence of this that steel is said to have greater *retentivity* than iron.

When the currents about the molecules have acquired the greatest degree of parallelism of which they are capable, the magnet is said to be *saturated*, i. e., that its magnetism is fully developed.

The theory that the magnetization of a bar is due to the forcing into parallel positions of its molecules by the stress exerted by an electric current or another magnet, is somewhat strengthened by our observation of what happens to a glass tube of iron filings when subjected to such a stress. If such a tube be submitted to the influence of an electric current or powerful magnet, and slightly jarred, and then carefully withdrawn, the tube will be found to have taken on polarity, or to have become a magnet. If now the tube be shaken so as to disturb the arrangement of the particles, the latter once more neutralize each other and the magnetism disappears.

The Earth a Great Magnet.—From its action upon

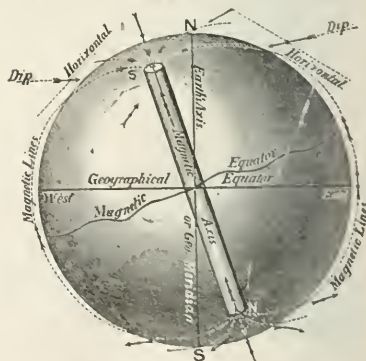


Fig. 92.—Terrestrial Magnetism.

a magnetic needle, we are led to believe that the earth is itself a great magnet, surrounded by lines of force, like the artificial magnets which we make. (Figs. 92 and 92a.)

Since only unlike poles attract each other, it follows

that if we call the north seeking end of a magnet the north pole, we should have to call the north magnetic pole of the earth a *south pole*, and the earth's south magnetic pole a *north pole*. This is the method adopted by the French, but it seems more reasonable to designate the poles by the terms positive and negative, and thus avoid such inconsistency.

Just what the exact cause of the earth's polarity may be we do not know, but as the globe is known to contain a large amount of iron and other magnetizable substances, and to be surrounded to a greater or less extent by electric currents, it does not seem unreasonable to suppose that these combined should be sufficient to account for terrestrial magnetic phenomena.

Declination and Dip of the Needle.—If the direction of the needle be compared with the North star, it will be found that, in most places, it does not point to the true North, but East or West of it, or in other words,

that the magnetic north pole does not coincide with the geographical North Pole, and therefore, that the magnetic meridians shown by the needle do not correspond with the terrestrial meridians. The angle between the magnetic and the geographical meridian of any place is known as the *declination* of the needle, and varies from year to year, the magnetic meridians sweeping alternately eastward and westward in oscillations of long periods.

The North magnetic pole has been located in Boothia, north of Hudson Bay, and the South magnetic pole in Victoria Land, in the Southern Hemisphere. (Fig. 92.)

The magnetic needle not only varies from a true North and South line, but from the horizontal as well. This variation is known as the *dip* of the needle. (Fig. 92.)

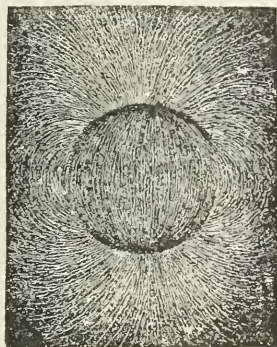


FIG. 92a.—Lines of Terrestrial Magnetic Force.

In the Northern Hemisphere the + end dips and at the magnetic north pole will point directly to the center of the earth. The same phenomenon is repeated in the Southern Hemisphere with the exception that it is the - pole which dips. On the magnetic equator the needle remains parallel to the horizon.

Connection Between Magnetism and Electricity.

—In the present lecture it has been shown that a magnet can be created by means of a current of electricity; in subsequent lectures it will be seen that the process can be reversed, and that electric currents can be created by means of the magnet. It will also be learned that a wire carrying a current of electricity acts like a magnet upon iron filings, and in the same way upon other wires through which currents are passing. From these and kindred phenomena it will be perceived that there is a very close connection between magnetism and electricity, so close in fact, that it is practically impossible to study the subjects separately.

PRACTICAL STUDIES.

(1) Obtain a cheap magnet and with it magnetize several steel knitting needles. Do this by placing one pole of the magnet in contact with the needle near the middle and drawing it slowly along the needle to the end. Repeat this several times, always applying the same pole of the magnet to the same end of the needle and drawing it in the same direction.

(2) Test the two needles upon each other and upon tacks or iron filings to determine if they have become magnetic.

(3) Suspend the needles some distance apart so that they swing freely, and determine which end of each points North. Mark this end with a file. Now bring the two needles near together and prove the law of like and unlike poles.

(4) Cover a magnet with a sheet of glass coated with a thin film of paraffin, and sprinkle over the latter some fine iron filings, jarring the glass lightly until the magnetic curves are produced.

(5) Magnetize a fine sewing needle, suspend it by a fine thread, and move it about over the curved rows of filings. What direction does the needle assume with regard to the lines of force?

(6) Remove the glass carefully, so as not to disturb the curves, and place on a warm plate or stove. When the film is softened, remove and cool. Preserve the glass as a permanent record of the curves.

SENIOR COURSE. LECTURE No. 27.

Group IV. Oleaginous Preparations.

Including All Liquid Preparations Whose Menstruum or Principal Solvent Is a Fixed or Volatile Oil or Oleic Acid.

This group includes two classes of official preparations, the Liniments and Oleates, though the Liniments only partially correspond to the definition given for the group, since several of them are made with alcoholic menstrua.

Both classes of preparations are intended for external application, and when dispensed should bear the label, For External Use Only, or some other statement of like import, since most of them are composed of powerful physiological agents.

Liniments and oleates are applied by friction and are usually intended to produce local results only, though some of them, as those containing mercury, may be applied for the production of constitutional effects through absorption.

The local effect of these preparations may vary from a mild stimulant or rubefacient to that of an escharotic. The intensity of the action is increased by applying in quantity and preventing evaporation by a close covering of cloth or bandage. The beneficial effects following the

use of the milder liniments is attributable in part to the friction with which they are applied.

LINIMENTA. The Liniments.

Liniments are liquid or semi-liquid solutions of medicinal substances in oily or alcoholic menstruum, and are intended for external application. The dissolved substances are usually of a pungent or vesicant nature, and the preparations are usually applied with friction. An "Opodeldoc" is a thick liniment consisting of soap, camphor and volatile oils dissolved in alcohol, and of a gelatinous consistence when cold. The term is also sometimes applied to liquid liniments of similar composition.

Soap is a frequent ingredient in liniments. Some liniments are formed by mixing a fatty oil with an alkaline liquid by which means a soap is formed and remains in solution mixed with an excess of the oil. Others consist of pungent or stimulating substances dissolved in alcohol.

The manufacture of liniments is usually a very simple process, consisting either of the admixture of different liquids, or of the solution of a solid in a liquid, with or without aid of heat. In some cases filtration is required. The official liniments are all intended for external use, and some of them contain actively poisonous ingredients. The nine official liniments may be grouped for study as follows:

Two are Liquid Soaps, with an excess of Fixed Oil.

Three are Solutions of Soap, Volatile Oils, and Camphor in Alcohol.

Two are Solutions of Fluid Extracts, with Camphor or Volatile Oils.

One is a Solution of a Stearopten in a Fixed Oil.

One is a Solution of a Fatty Cerate in a Volatile Oil.

Liquid Soaps with Excess of Fixed Oil.

Linimentum Ammoniac. Ammonia Liniment.—Mix thoroughly by agitation in a bottle 350 Cc. Ammonia Water, 50 Cc. Alcohol and 600 Cc. Cotton Seed Oil.

Should be freshly prepared when wanted, as it loses ammonia on standing.

This preparation is also known as "Volatile Liniment," from the volatile alkali which it contains. Used principally as a stimulating application to lame and stiffened joints.

Linimentum Calcis. Lime Liniment.—Prepared by mixing thoroughly, by agitation, equal volumes of Solution of Lime and Linseed Oil.

Formerly known as "Carron Oil," because much used at the Carron Iron Works, Scotland. Used as a soothing application to burns, and applied on lint or cotton.

Alcoholic Solutions of Soap and Volatile Oils.

Linimentum Saponis. Soap Liniment.—Dissolve 45 Gm. Camphor in 750 Cc. Alcohol, add 70 Gm. Soap, in fine powder, 10 Cc. Oil of Rosemary and shake the bottle a few minutes. Add sufficient water to make 1000 Cc., let stand 24 hours and filter.

The object of the filtration is to remove the sodium palmitate which the soap contains, and which is insoluble in Alcohol.

Soap liniment is used as a mildly stimulating application, and in the preparation of Chloroform Liniment.

Linimentum Chloroformi. Chloroform Liniment.—Mix 300 Cc. Chloroform with 700 Cc. Soap Liniment. More stimulating than the preceding, with the anodyne properties of the chloroform. As the latter substance is very volatile, it should be covered when applied with some impervious covering, as waxed or oiled paper or silk.

Linimentum Saponis Mollis. Liniment of Soft Soap. (Tincture of Green Soap).—Dissolve 20 Cc. Oil of Lavender Flowers in 300 Cc. Alcohol, mix with 650 Gm. Soft Soap, and let stand 24 hours. Filter through paper, and add water through the filter to make 1000 Cc. Similar in properties to the two preceding.

Alcoholic Fluid Extracts with Camphor and Volatile Oils.

Linimentum Belladonnae. Belladonna Liniment.—Dissolve 50 Gm. Camphor in about 200 Cc. Fluid Extract of Belladonna, and add enough of the fluid extract to bring the measure to 1000 Cc.

Linimentum Sinapis Compositum. Compound Liniment of Mustard.—Dissolve 60 Gm. Camphor in 500 Cc. Alcohol, add 200 Cc. Fluid Extract of Mezereum, 30 Cc. Volatile Oil of Mustard, 150 Cc. Castor Oil, and sufficient Alcohol to make 1000 Cc.

Vesicant and counter-irritant. Should be covered with oiled silk when it is desired to blister.

Solution of a Stearopten in a Fixed Oil.

Linimentum Camphorae. Camphor Liniment.—Place 200 Gm. Camphor, in coarse powder, and 800 Gm. Cotton Seed Oil in a suitable flask, loosely stoppered, and heat by means of a water-bath, with occasional shaking, until solution is effected. Has the stimulating and anodyne properties of camphor, and is applied to stiffened joints, etc.

Solution of a Fatty Cerate in a Volatile Oil.

Linimentum Terebinthinae. Turpentine Liniment.—Melt 650 Gm. Resin Cerate on a Water-Bath, and mix with 350 Gm. Oil of Turpentine.

This is the preparation known as Kentish Liniment, celebrated as an application to scalds, burns and erysipelas. It is applied on pledgets of cotton or lint.

OLEATA. The Oleates.

The official Oleates are solutions of medicinal substances in Oleic Acid. Oleic Acid is chosen as the menstruum because of the supposed readiness with which it is absorbed through the skin.

In consistence the oleates stand between the liniments and the ointments, and are usually of a soft, butter-like consistence. In properties they more nearly resemble the ointments, since they are used more for the effects obtainable through absorption than for local stimulation or counter-irritation.

The official oleates are made by dissolving an organic or inorganic base in oleic acid, and should be distinguished from the true or normal oleates, which are composed of a base chemically combined with the radical of oleic acid.

The normal oleates may be prepared by precipitating a solution of sodium oleate (castile soap) with solutions of various metallic salts, added in molecular proportions, the resulting precipitate being collected, washed, dried and reduced to powder. Prepared in this manner, they are soft, unctuous powders and combine readily with the various fatty bases to form ointments.

The official oleates probably contain more or less of normal oleates dissolved in excess of acid. Like the ointments, they are applied by inunction. As a rule they are more irritating than the ointments, and are liable to produce pustulation if applied by friction without previous dilution.

Oleates containing metallic substances are frequently unstable, decomposing on standing and throwing down a pulverulent deposit of reduced metal.

The formulae of the official oleates may be used as models for the preparation of similar oleates extemporaneously. The use of heat should generally be avoided, as liable to hasten decomposition.

In preparing the alkaloidal oleates the free alkaloïds must be used, since their salts are not soluble in oleic acid. A free alkaloïd may be obtained from any of its soluble salts by dissolving in water and precipitating with an alkali, as ammonia.

Three oleates are official, two made from metallic oxides, and one from an alkaloid.

Made from Metallic Oxides.

Oleatum Hydrargyri. Oleate of Mercury.—Sift 200 Gm. Yellow Mercury Oxide, thoroughly dried, upon 800 Gm. Oleic Acid contained in a capacious mortar, and mix with constant stirring. The mixture is then set in a warm place, but not exceeding 40° C., and frequently stirred until the oxide is dissolved.

Used like mercurial ointment, to produce the constitutional effects of mercury by absorption through the skin. This oleate decomposes in time, with deposition of metallic mercury.

Oleatum Zinci.—Oleate of Zinc.—Sift 50 Gm. Oxide of Zinc upon 950 Gm. Oleic Acid contained in a capacious vessel, and incorporate by constant stirring. Let the mixture stand for a few hours, and then complete the solution of the oxide by the heat of a water-bath, stirring constantly.

Made from an Alkaloid.

Oleatum Veratrine.—Oleate of Veratrine.—Rub 2 Gm. Veratrine with a small portion of Oleic Acid in a warm mortar till reduced to a smooth paste, then add sufficient of the acid, previously warmed, to make 100 Gm. and stir frequently until the alkaloid is dissolved.

Used as a counter-irritant in rheumatism, scrofulous swellings, etc.

DI-PHENYL TARTRATE.—A process has been patented for the preparation of this substance, which is intended for medicinal purposes. Finely powdered, anhydrous, normal potassium tartrate is heated for fifteen hours with pure, crystallized phenol and phosphorus oxychloride. The product of reaction is mixed with cold water, which causes the separation of a heavy oily fluid. This is repeatedly washed with water, then with alcohol, and is then made to crystallize by rubbing the inside walls of the container with a glass rod. The crystalline mass is washed with alcohol, dried upon porous plates, and finally recrystallized from alcohol. The product is in fine needles of silky luster, melting at 101° to 102° C. (Südd. Ap. Ztg.).

SENIOR COURSE, LECTURE No. 18.

Materia Medica.

PROF. L. E. SAYRE, B.S.C., PH.M.

A.—Organic, Potent Drugs.

The members of this group are taken from the report of the committee on pharmacy laws, found in the Proc. Amer. Pharm. Assn., 1897, pp. 293-297. In the list will be found some toxicoid drugs. The committee urges that every drug in the group be subject to legal restriction. The author, however, hopes to see State restriction and surveillance over all articles of the materia medica. No medicinal substance in any one of the groups should be dispensed without passing through the hands of a competent pharmacist.

The term "Potent" as distinct from "Violent Poisons," applied by the committee above mentioned is expressed in about the following words: Those drugs whose average dose does not exceed two grams (or 30 grs.) and all liquid preparations of these containing, or representing, more than two grams (30 grs.) in the average teaspoonful (5 Cc. or minims); all solid preparations containing two grams (30 grs.), in 5 grams (or 75 grs.); and all fluid extracts, 50 per cent. tinctures, extracts, resins, active principles and all preparations representing 40 per cent. or more of the members of the list. All are included as potent drugs.

In addition to the names of the drugs of this group mentioned in the report, will be attached the medical property, dose (in grains), and official preparations. The student will please refer to the lectures on pharmacognosy, where he has been urged to study the botanical origin, common name and physical characteristics of each drug. This he can do by referring to the pharmacopœia and other books referred to in this course. The potent drugs mentioned are as follows:

Absinthium.—Stimulant and anthelmintic. Dose, 15-60 gr.

Aloes.—Cathartic, emmenagogue, vermifuge. Dose, 2-10 gr. (Pil. Al. et Asafoetida; Pil. Al. et Ferri; Pil. Al. et Mastiches; Pil. Al. et Myrrha; Tr. Aloes; Tr. Al. et Myrrha; Ext. Colocynth. Co.; Pil. Rhei Co.; Tr. Benzoïn Co.).

Ammoniac.—Stimulant, expectorant. Dose, 10-30 gr. (Emulsion, Plaster of Ammoniac with Mercury).

Apocynum.—Emetic, cathartic, expectorant, etc. Dose, 5-30 gr. (Fluid extract).

Asafoetida.—Stimulant, antispasmodic, expectorant, etc. Dose, 5-30 gr. (Emulsion; Pil.; Tincture; pil. aloes et asafoetida).

Asclepias.—Diaphoretic, emetic, expectorant, cathartic, etc. Dose, 15-60 gr. (Fluid extract).

Aspidium.—Tœniafuge. Dose, 30-60 gr. (Oleo-resin).

Aspidosperma.—Tonic, antispasmodic, antiperiodic. Dose, 15-60 gr. (Fluid extract).

Bryonia.—Cathartic, emmenagogue, vesicant, emetic. Dose, 10-60 gr. (Tincture).

Cambogia.—Drastic, hydragogue, cathartic. Dose, ¼-5 gr. (Pil. cathartic Comp.).

Camphor.—Autispasmodic, stimulant, nervine, diaphoretic, etc. Dose, 1-5 gr. (Aqua; liniment; cerate; spirit; lin. belladonna; lin. saponis; lin. sinapis co.; pulv. morph. co.; tr. opii camph.; monobrom. camph.).

Cannabis Indica.—Anodyne, nervine, sudorific, narcotic, aphrodisiac. Dose, 5-15 gr. (Extract; fld. extr.; tincture).

Capsicum.—Stimulant, sremachic, diaphoretic, rubefacient. Dose, 1-5 gr. (Fluid extr.; oleoresin; tincture; plaster).

Caulophyllum.—Antispasmodic, diuretic, emmenagogue. Dose, 10-30 gr.

Chelidonium.—Cathartic, diuretic, diaphoretic, expectorant. Dose, 15-20 gr.

Chrysarobin.—Irritant. Dose, ¼-20 gr. (Ointment).

Cimicifuga.—Alternative, emmenagogue, sedative. Dose, 5-30 gr. (Glycerite; fld. extr.; tincture).

Coca.—Stimulant, tonic, diaphoretic, narcotic, anæsthetic. Dose, 15-60 gr. (Fl. extr.; cocaine hydrochlorate).

Convallaria.—Heart, tonic, emetic, purgative, sternutatory. Dose, 2-8 gr. (Fluid extract).

Cypripedium.—Antispasmodic, diaphoretic, stimulant. Dose, 5-15 gr. (Fluid extract).

Dulcamara.—Narcotic, diuretic, diaphoretic, alterative. Dose, 60-120 gr. (Fluid extract).

Eunymus.—Laxative, diuretic, tonic. Dose, 20-60 gr. (Fluid extract).

Fel Bovis.—Tonic, laxative, cholagogue, antiseptic, vermifuge. Dose, 5-30 gr. (Purified ox gall).

Granatum.—Anthelmintic, tœniafuge. Dose, 20-30 gr.

Gualac.—Diaphoretic, alterative, stimulant. Dose, 30-120 gr. (Decoction Sarsaparilla comp.).

Gualac Resina.—Diaphoretic, alterative, stimulant. Dose, 5-30 gr. (Tinct.; ammoniated tincture; pil. antimony comp.).

Hydrastis.—Alterative, tonic, aperient. Dose, 5-40 gr. (Glycerite; fld. extr.; tincture; hydrastine hydrochlorate).

Ipecac.—Emetic, expectorant, diaphoretic, etc. Dose, 1-20 gr. (Fld. extr.; syr.; wine; troches; tr. ip. et opii.; pulv. ip. et opii.; troch. morph. et ipecac).

Jalap.—Hydragogue, cathartic, diuretic. Dose, 5-30 gr. (Ext.; comp. powder; resin; comp. cath. pills; veg. cath. pills).

Juglans.—Cathartic, tonic, rubefacient. Dose, 60-120 gr. (Extract).

Kamala.—Tœniafuge, anthelmintic, purgative. Dose, ¼ drachm.

Leptandra.—Emeto-cathartic, tonic, alterative. Dose, 15-60 gr. (Extr.; fld. extr.; pil. cath. veg.).

Lobelia.—Expectorant, emetic, nervine, purgative. Dose, 1-20 gr. (Fld. extr.; tincture).

Lupulinum.—Stimulant, tonic, anodyne. Dose, 5-10 gr. (Fluid extr.; oleoresin).

Mezereum.—Stimulant, diuretic, sialagogue, vesicant. Dose, 1-6 gr. (Fld. extr.; lin. sinapis, co.; decoct. sars. co.; fld. extr. sars. co.).

Myrrha.—Stimulant, tonic, expectorant, emmenagogue. Dose, 5-30 gr. (Tinct.; tr. aloes and myrrh; pil. aloes and myrrh.; pil. rhei comp.; mist. ferri comp.).

Phytolacca.—Alterative, laxative, emetic. Dose, 5-15 gr.

Pilocarpus.—Diaphoretic, sialagogue, myotic. Dose, 15-30 gr. (Fluid extr.; Pilocarpine hydrochlorate).

Podophyllum.—Cathartic, tonic, alterative. Dose, 5-15 gr. (Extract; fld. extr.; resin).

Quassia.—Tonic, febrifuge, anthelmintic, bitter. Dose, 15-60 gr. (Extract; fld. extr.; tincture).

Rheum.—Aperient, purgative, astringent, tonic. Dose, 5-30 gr. (Extr.; fld. extr.; mist. rhei et sodæ; syrup; pills comp.; pulv. comp.; tinct.; ar. tr.; ar. syr.; sweet tinct.).

Rubus.—Astringent, tonic. Dose, 30-120 gr. (Fluid extr.; syrup).

Sanguinaria.—Emetic, stimulant, tonic. Dose, 1-30 gr. (Fluid extr.; tincture).

Santonica.—Anthelmintic, stimulant, emmenagogue. Dose, 15-60 gr. (Santonin; troches).

Scammony.—Hydragogue, Cholagogue, cathartic. Dose, 1-5 gr. (Resin; extr. colocynth comp.).

Scoparius.—Diuretic, narcotic, emetic cathartic. Dose, 15-30 gr. (Fluid extr.; sparteine sulphate).

Senega.—Expectorant, diuretic, diaphoretic. Dose, 3-20 gr. (Fluid extr.; syrup; syrup squill comp.).

Serpentaria.—Stimulant, tonic, diaphoretic, diuretic, etc. Dose, 5-30 gr. (Fld. extr.; tinct.; tr. cinch. co.).

Squill.—Expectorant, diuretic, emetic. Dose, ¼-5 gr. (Vinegar; syrup; fld. extr.; compd. syrup; tincture).

Viburnum.—Diuretic, tonic, antispasmodic, nervine. Dose, 60-120 gr. (Fluid extract).

Zingiber.—Carminative, stimulant, sternutatory, rubefacient. Dose, 5-30 gr. (Fld. extr.; syrup; oleoresin; tincture; troches; pulv. arom.; pulv. rhei comp.)—See also Zingiber under Aromatics.

Many of the drugs of the preceding list have alkaloidal constituents which give to them their physiological activity. Among those prominent in this particular are,

Aspidosperma, a drug containing several alkaloids represented in the Aspidospermum of the market. Pilocarpus contains an official alkaloid (in the form of hydrochlorate) representing, in dose of 1-20 to 1-3 of a grain, the medical properties of the crude drug. The same may be said of Hydrastis, Coca, Ipecac, Lobelia, and Granatum.

Other members of the group contain valuable resins and resinoids; among this number may be mentioned Cannabis indica, Podophyllum, Cimicifuga, Jalap, Lepandria, Lupulin, Myrrh, Guaiac, etc. It is advisable for the student to refer to any work on Materia Medica in order to learn, among other things relating to the drug, the nature of the active principle contained in it, whether it be acid, alkaline or neutral; whether a glucoside, bitter principle, resin or an alkaloid; whether bitter, acrid, pungent, or aromatic; whether it be volatile or stable. Such information will be almost indispensable for a clear understanding of the members of this group.

Physiological Action and Therapeutic Application.—As only the most general terms have been employed in the synopsis of the drugs of this group, the author will here suggest a method for enlarging upon the work by giving one or two examples.

Lobelia.—Physiological action: moderate doses depress the heart and vasomotor centre, toxic doses produce severe burning in the esophagus and stomach, vomiting and finally paralysis of the respiratory centres. Therapeutic Application: Formerly used as an emetic, but has been replaced by less depressing drugs. It is used at present in asthma, bronchitis, etc.

Podophyllum.—Phys. Action: In full doses a powerful purgative, acting by being absorbed, producing copious stools. In small doses exerts a cholagogue effect, increasing the flow of bile. Toxic doses produce symptoms of gastro enteritis. Ther. App.: Employed as a laxative in constipation and as a purgative in hepatic congestion, best given with other cathartics and with small doses of sedative extracts to overcome the griping.

Before leaving the discussion of the members of the class of potent organic drugs, attention should be called to the fact that some important drugs whose average dose does not exceed 2 grams, have been omitted in the tabulated list published by the committee, but are nevertheless intended to be included. Cinchona, for example, from various points of view, is one of the most important drugs of materia medica. The author has therefore determined to treat this drug more fully in order to give at the same time a pattern which the student may follow for himself in studying the various properties of each drug.

Cinchona.—Origin. The bark of Cinchona Callisaya Weddell; Cinchona officinalis L. and of their hybrids and those of other species of cinchona, yielding when assayed not less than 5 per cent. of total alkaloids and at least 2.5 per cent. of quinine. The original geographical source of Cinchona is South America, on the eastern slope of the Andes, beginning in Bolivia and extending through Peru. In Ecuador it occupies the eastern slope of the western Cordilleras, entering the highlands of New Grenada by two narrow belts. Of recent years the trees have been cultivated in other countries where the temperature and humidity of the climate are favorable. Extensive plantations are now flourishing in the Neelgherry hills and in the valleys of the Himalayas in British Sikh, in Ceylon, Java, Jamaica, etc.

Description of the Drug.—On pages 91-92 of the U. S. P. will be found descriptions of the yellow bark, (Cinchona Callisaya) and of the red (Cinchona Succirubra). These descriptions, however, are not of much importance, for the bulk of the valuable barks which enter into the market do not belong to either of these varieties. The one point upon which especial stress is laid in estimating the value of a given sample of cinchona is, what percentage of alkaloid does it assay? How much of this is quinine, how much cinchonidine, and how much cinchonine? To the pharmacognosist the structure (the histology) of the various barks is of much importance. Certain structures mark certain alkaloidal values. Microscopically it may be said of cinchona bark that, as compared with other barks, the fibers of the liber are shorter and more loosely arranged, being for the most part separated into simple fibers embedded in the bast parenchyma, or united into short bundles. Some of the barks have stone cells, while in others they are lacking.

Constituents: Among the various alkaloids found in Cinchona, the following are the most important: Quinine, quinidine, cinchonine, and cinchonidine, the medical value of the bark depending almost entirely upon the alkaloid quinine. Other less important ingredients are kinic and kinovic acids, kinovin, cinchotannic acid, cinchona-red, and a minute quantity of a butyrateous, volatile oil. The ash amounts to between 1 and 2 per cent., consisting chiefly of the carbonates of calcium and potassium. Dose of the powdered bark, 15-60 gr.

Medical Properties.—The action of cinchona is largely dependent upon its constituent alkaloids. Preparations of the bark when given internally in moderate doses have the effect of a nutrient tonic, acting upon the alimentary canal about as do the simple bitters, accompanied with astringency. Large doses, especially of the representative alkaloids, diminish the amount of the waste products (urea, uric acid, etc.), depress the heart, and, in fevers, lower the temperature to a marked degree. The nervous system is affected peculiarly by large doses, causing what is known as *cinchonism* (a giddiness and ringing in the ears with impairment of hearing, etc.), which seems to indicate cerebral congestion. Cinchona is valued chiefly for its antiseptic action in malarial diseases. The activity of the malarial plasmodia is lessened or the plasmodia disappear from the blood under the use of the drug or its alkaloidal salts. It also exerts a preventive influence upon putrefactive and allied processes.

Official Preparations of Cinchona.—Extractum Cinchonæ; dose, 5-30 gr. Extractum Cinchonæ Fluidum, dose, 10-60 m. Infusio Cinchonæ (6 per cent.); dose, 1, fld. dr. Tinctura Cinchonæ (20 per cent.); dose, 1, fld. dr.

Of Cinchona Rubra.—Tinctura Cinchonæ Composita (10 per cent. with bitter orange peel 8 per cent., and sassafras 2 per cent.) Dose, 1, fld. dr.

Official Alkaloids and Salts.—Cinchonidine Sulphas, dose 10-30 gr.; Cinchonina, dose 5-30 gr.; Cinchonine Sulphas, dose 5-30 gr.; Quinidine Sulphas, dose 5-30 gr.; Quinine, dose 1-60 gr.; Quinine Bisulphas, dose 1-15 gr.; Quinine Hydrobromas, dose 1-20 gr.; Quinine Hydrochloras, dose 1-15 gr.; Quinine Sulphas, dose 1-60 gr.; Quinine Valerianas, dose 1-20 gr.

The term potent is by no means confined to the organic drugs of the Pharmacopœia. There is a very large class of inorganic salts which, while they cannot be classed as poisonous on the one hand nor inactive on the other, are nevertheless potent in the sense in which we use this term. We therefore have:

B.—Inorganic Potent Drugs.

In naming the inorganic salts properly coming within the range of potent drugs, we are obliged to make an arbitrary list. As a basis for this list we would say that all those salts whose average dose is 5 grains, and, perhaps, over, may be considered potent. Some of the members of the group may have a very large dose, as, Magnesium Sulphate (5), or solution of Magnesium Citrate (3xii), yet none of such preparations can be considered as non-potent. Although the range which embraces these inorganic salts seems very wide, yet we find that it includes only a few groups, beyond which we run into the sphere of toxic or poisonous drugs. The following comprises the various groups yielding potent inorganic salts:

Salts of Potassium, Sodium, Ammonium and Lithium.
Salts of Magnesium.
Salts of Calcium and Strontium.
Salts of Iron.
Salts of Bismuth.

Official Salts of the Alkalies Regarded as Potent.—Before naming the members of this division, attention should be called to the fact that some of the acid radicles, even when combined with the alkaline bases, do not in any degree lose their toxic action. Such salts as the Cyanide of Potassium represent the sum of the component parts, namely the toxic properties of the alkali, *per se*, and of the acid radicle with which it is associated. It is therefore obvious that it will be necessary to eliminate salts of the alkalies whose acid radicles are especially toxic, for example the cyanides, permanganates, chromates and bichromates, etc. On the other hand, the caustic alkaline hydroxides, whose bases are scarcely neutralized, should also be transferred to the toxic group.

(Special Correspondence.)

PHARMACY NEWS FROM GREAT BRITAIN.

London, Dec. 1st, 1898.

The approach of Christmas has led to increased business in retail pharmacies, but during the autumn trade has been very dull and on the whole little news has been forthcoming.

The New B. P.

has become a settled fact, and criticisms are plentiful, but the discussions on its merits have taken place without the precincts of the Pharmaceutical Society so far, and it seems doubtful if an evening meeting will be given up for the purpose.

Not many years since the only meetings of pharmacists were held in London and Edinburgh, but of late local associations have been formed and developed with great rapidity, and the meetings of these associations are the occasions when we learn what trade opinions are. Most of our large provincial cities have local associations now, and it is due to them largely that the recent passing of the Pharmacy Amendment Act is due.

The Pharmacy Amendment Act

provides that all qualified chemists and druggists may be elected members of the Pharmaceutical Society, and it is hoped that this will consolidate the society and enable the council to attempt some further reforms.

Previous to the passing of this act only men who had passed the Major examination were eligible as members, and now that the passing is not essential, few candidates will enter for it. The Minor examination has been getting more severe for several years, and there is no doubt that the Minor man of to-day is as well qualified by his course of study as the Major man of ten years ago. The last Minor examination was a disastrous one for the candidates, for out of 266 up, only 66 were successful. This is partially attributed to the fact that the next examination will include the study of the 1895 Pharmacopoeia, and many men were anxious to escape this.

During the past month all the colleges, schools and medical schools have started their winter course, and of the inaugural addresses the one which called forth most comment was that of Sir James Crichton Browne, F.R.S., to the students of the Pharmaceutical Society's school. The public press attended the meeting, which dwelt at length with the question of

Poisons and Poisoning.

and the address reached a larger audience than it was intended to.

In speaking of the criminal methods of poisoning, Sir James remarked how easy it would be for a scientific scoundrel to disseminate such diseases as typhoid, cholera, or anthrax by means of germs propagated in a bacteriological laboratory, and he pointed out the necessity of scientists being men of integrity. The newspaper men evidently did not know much about bacteriology, and Sir James was very severely criticized for suggesting such wicked thoughts to embryo pharmacists.

At the opening meeting of the Chemists' Assistants' Association, the new president, F. W. Gamble, deplored the fact that chemists did not continue their scientific studies when they were once qualified. This question has been brought up on several previous occasions, but so far nothing has been done to remedy the defect, and there is no doubt an opening for advanced classes in either of the practical minor subjects.

The Chemists' Assistants' Association has been in existence for twenty-two years, and financially is in very good position. Its aim and object are to provide social

and pharmaceutical intercourse for assistants, and the formation of another Chemists' Assistants' Union will not interfere with this work. The latter mentioned body seem to desire a "Union" which will partake of the nature of a trades union, but time will show best how they will succeed.

During the last year there has been an increased demand for qualified

Lady Pharmacists.

to act as dispensers, and there is no question that the demand will be fully met.

The advertisements of vacancies are often amusing, and require the qualified lady to turn her hands to many things which are not pharmaceutical, and many duties which only a woman could fulfill. For all that, however, there are some well paid appointments held by ladies at the present time, and the prospects are really good for any capable ones.



PROF. RAY LANKESTER.

During the summer the directorship of the Natural History Department of the British Museum has been conferred upon Professor Ray Lankester, and the duties pertaining to his important post will bring him even more prominently before the scientific world than heretofore. The Museum is the most complete in existence and contains immense collections of specimens from the animal, vegetable and mineral kingdoms. For pharmacy students the Mineralogy Department is the most fascinating, but the Botanical Section and the Herbarium are of most practical assistance to them.

A new Act of Parliament which has recently come into force provides that persons who have conscientious objections to vaccination may be relieved of the necessity of having their children vaccinated, provided they state their objections before a magistrate and get a certificate of so doing. At many police courts large numbers of people have appeared to state their objections, and in some places the magistrates sit specially during work people's dinner hour to grant exemptions. Whether this will prove satisfactory only an epidemic of small-pox can show, but that experience may prove dearly paid for by the exemptions which are being granted freely at present.

In the wholesale, business has been brisk since the autumn commenced, but there have been no startling movements in the drug markets, and now that "France and Fashoda" has become dormant, little excitement will be provided. The close of the Egyptian campaign will leave the Soudan free for trading, and much of the trade which has been lost for many years is expected to be opened up again soon.

In the chemical market potassium iodide and iodine have advanced in prices, owing to the combination putting up the price, and quinine is likely to advance slightly before long.

RESTORATION OF RANCID BUTTER.—A factory for this purpose is said to be in operation in England. The process consists in incorporating the old butter with fresh buttermilk, until a homogeneous, semi-fluid mass is obtained. A current of hot air is passed through this mixture, to expel the butyric acid to which the characteristic odor and taste of rancid butter are due. Any mechanical impurities present sink to the bottom. A current of cold air is then forced through the mixture, so that the butter is separated in globules. The separated butter is treated with water, salted, and, if necessary, coloring matter added. (Südd. Ap. Ztg.)

MONSONIA OVATA, a Geranacea indigenous to the Transvaal, contains in all parts, particularly in the root, a large quantity of tannic acid. Mabertz claims to have used the infusion and fluid extract with great success in dysentery. (Ph. Post.)

F. W. GAMBLE,
Pres. Chem. Assist. Assoc.

DRUG BUSINESS IN CHINA.

As attention is now considerably attracted toward China, some recent reports from our consuls on the drug trade are of special interest. Consul Ragsdale, at Tientsin, reports as follows:

In Tientsin, a city of 1,000,000 inhabitants, there are but two drug stores conducted by foreigners. These are branch stores, representing English and French chemists of Hong Kong, where nearly all their stock is manufactured. They import but very little, indeed, and I regret to say that not more than 5 per cent. of that which is imported comes from the United States. Every effort is made to sell goods of their own manufacture in preference to those imported. These firms are permitted to carry on business in all treaty ports, untrammelled by any laws, save those of the countries of which they are citizens. Their patrons are mostly foreigners, but of late years they have devoted some attention to the manufacturing of certain drugs that are most pleasing to the tastes and superstition of the Chinese, and their sales are increasing rapidly every year.

The Chinese Government have no laws regulating the sale of drugs, and Chinese merchants, however ignorant of pharmacy, are permitted to sell drugs, so long as they pay what is known as the liken tax. There is a board of examiners at Peking before whom practitioners are presumed to pass examinations, but the law requiring such examinations is seldom, if ever, enforced; and if it is, a little "squeeze" overcomes every obstacle. Every Chinese scholar is more or less a physician. By reading over a few old prescriptions, he is able to and does prescribe for himself and others; but generally his efforts are most ludicrous, and frequently disastrous to the patient. A prescription for weak and diseased lungs has been translated for me. It recommends the use of a decoction made from ginseng, apricot kernels, and "seven other medicines," without indicating name or nature of the last seven. For scalds, burns, ulcers, and tumors, an ointment made from "fifteen poppy leaves" is recommended. This same ointment mixed with sesame oil and water is also taken inwardly for smallpox and fevers. For general weakness, powders made from tiger bones, bears' claws, and the scales of the armadilla are prescribed.

There are over 300 herbs used as medicines by the Chinese, but few of them are important. They are rhubarb, cinnamon, peppermint, licerice, orange peel, ginger, frankincense, castor beans, cardomom and aloe seeds, myrrh, dates, and almonds. Strange to say, opium is never prescribed or used by the Chinese as medicine. Digitals and stramonium are found in China, but apparently their virtues are unknown to the native physicians. Outside of mercury, which is used extensively, mineral drugs are never prescribed.

Pharmacists holding diplomas from American or European colleges are permitted to practice their profession in China without question.

There is a field here for the sale of drugs and medicines, but, as in all other trades, the business should be conducted by Americans. Our merchants should be made to understand, once for all, that they cannot do business here unless they establish reliable agents in the principal treaty ports, who are ever with us, ready to take advantage of the markets at the right time and place; circulators rarely procure orders. Active work with the merchants here always wins. Nine-tenths of the goods imported here come from Europe, and the retail prices are extremely high. A live responsible American firm, with good capital, carrying American goods only, could do a thriving business at Tientsin. On my recommendation, several of our retail firms, all foreigners, have given sample orders to the United States dealers with the most pleasing results.

Medicines imported are not subject to duty, but are admitted free.

Consul Goodnow, at Shanghai, says: There are no State or municipal laws regulating the drug business in Shanghai. Any one can open a drug store and sell every kind of drugs. No license is required, nor is any diploma from any college of pharmacy asked for. No distinguishing mark is required for poisonous drugs. All drug stores, whether run by foreigners or natives, are allowed to fill

prescriptions. In practice, no drugs or medicines are sold except in drug stores. Department stores, as we understand the term, are unknown. Physicians' prescriptions are understood as belonging to the patient, and may be either left with the druggist or carried away by the owner, who may have them refilled as often as he desires. Almost all drugs are brought here from England. Only a few proprietary articles come from America. There is a large sale for quinine and for all classes of tonics and strengthening medicines. The sudden and extreme changes of temperature, the extreme heat of the summer, the great amount of moisture during the whole year, and the Chinese practice of going without artificial heat in their houses during the winter, make coughs and colds, pneumonia, and asthma, very prevalent. Beef extracts and like preparations are in demand, but as the drug firms are English, they naturally prefer to and do push English preparations. Many of the Chinese drug stores deal largely in imitations of proprietary medicines and perfumes. We have no treaty protecting such articles.

Consul Wildman, at Hong Kong, has this to say: "The price of all drugs, in spite of the fact that this is a free port, is, in most instances, nearly twice what it is in the United States. It is claimed by the druggists that this excessive charge is owing to the short life of all drugs in this climate—which, in my judgment, is rather an excuse than a fact.

When I left San Francisco in August, 1897, a leading drug store of that city (Wakelee & Company) requested me to take a package of headache powder, that has a deservedly more than local fame, to the leading druggists of Hong Kong, for possible introductions. I undertook the mission gladly. After my arrival, I presented a sample box of the powder to a leading drug store (Watson & Company), and was informed that they imported the mixture in bulk from London, and kept it in air-tight glass jars, and when they put it up, they never prepared over six powders at a time, which they folded in oiled paper, and for which they charged \$1.50—three times the price of the American article.

They claimed that the powder I brought would be useless in two months, owing to the dampness of the climate. I wrote the facts back to San Francisco, and, supposing my big package of powders to be lost, took no pains to preserve them. However, after seven months, I find them as good as ever, and as efficacious in cases of headache. The case illustrates the methods of the drug stores in the English colonies. First, American medicines are ordered, in bulk from English houses, who manufacture them from prescriptions. Second, the price of most drugs is exorbitantly high, not because of protective duties or royalties, but because of their alleged waste in this climate.

Another well-known patent California medicine—"Syrup of Flgs"—is sent out to this coast in bulk and bottled and labeled. From use, I consider it a poor imitation. I do not know whether the American owner receives any royalties on its sale or not.

Although the drug stores, both English and German, are numerous, large and paying properties, their supply of medicines is very limited; or it would be, possibly, more correct to say, their modern drugs are limited. It is a daily occurrence to send down prescriptions of which one or two ingredients are not to be had. The druggists here are in the habit of compounding the prescriptions by substituting ingredients of a like nature without consulting the writer of the prescription.

The excuse for all things is, that nothing can be had nearer than London, and the weather will not permit of large stocks being carried.

During the plague season, the sanitary board advised people to put chloride of lime about. The supply in the colony ran out in one day. The day after the recommendation was made we could not obtain two pounds.

There are no Government regulations as to the number of chemists' shops, and in the so-called drug stores everything is sold, from whisky and musical boxes to soda water and candy. Of these, there are six shops where physicians' prescriptions are dispensed by qualified chemists (pharmacists). There are numerous Chinese drug stores where native herbs and roots are sold and exported, especially to the United States.

The value of Chinese medicine, recorded in the consulate as being sent to the United States, for the quarter

ending March 31, 1898, was, in round numbers, \$5,000— which amount, if multiplied by 5, will come nearer what the exporters really value their medicines at—deer horn and ginseng being the most highly prized articles in their stocks, one deer horn often being valued at \$500 and invoiced at \$5, or an ounce of Mandarin ginseng, invoiced at \$1, which is worth \$50.

This being a free port, it is impossible to determine the amount of drugs exported and imported. The medicines are imported chiefly from Great Britain. Whatever American medicines are in demand generally come through a London agency. Heavy chemicals are imported from Great Britain and Germany. Here, as all over the world, the best advertised proprietary articles have the best sale.

Practitioners of pharmacy in Hong Kong have either English, German, or Portuguese diplomas, but there are no restrictions, and a holder of a diploma from a recognized college of pharmacy in the United States would be equally eligible.

BOOK WORMS.*

The naturalist frequently spends a good deal of time in abuse of his fellow man, considered in the light of a destructive agent; he points ruefully to the reduced faunas and floras of certain islands, to the dodo, to the moa, and to various creatures which have been extirpated by the direct or indirect influence of human occupation of the countries where they once flourished. But there is no action without compensation, and while man has sensibly impoverished the fauna and flora of the world in which he lives in some directions, he has unwittingly encouraged and promoted the welfare of many creatures belonging to humbler groups than those which he has thinned or entirely abolished. The average householder, as he takes his nightly rounds with a view to bolts and bars, is probably not aware that with luck and under favorable circumstances he might meet with nearly one hundred species of insects and other allied forms to whom he has not only furnished secure lodgings, but abundant food. Several species of clothes moth batten upon his Sunday coat; two species of cockroaches may or do stalk boldly through his kitchen; and, in short, a host of creatures—some of them importations from abroad, destitute aliens in fact, thrive at the expense of the most formidable enemy of the brute creation. Our libraries afford pasturage to quite a number of small creatures, for the most part beetles, which have found in the dry leather and paper (and doubtless, too, on account of the infrequency with which books are apt to be consulted) a more suitable home than the woods which they presumably at one time inhabited. The Rev. J. F. X. O'Connor, whose interesting little book about bookworms is before us, was led to investigate these destructive creatures by discovering one in an old folio belonging to the library of Georgetown College.

Being a lover of books, it is not surprising to find that the author's interest in his discovery was tempered by a reflection upon the enormous damage which the ancestors of his capture had inflicted in their time. He proceeds to remark—perhaps with more truth than freshness—that "books are precious things, for in them lies stored the wisdom of centuries." But, although a man of letters rather than a man of science, Father O'Connor divides his booklet fairly—even rigidly—into two parts; one of these is devoted to the literary history of the bookworm, the other to its natural history and depredations. It is upon the latter half that we shall have most to say here.

The expression "the bookworm" is often used; but it is inaccurate, for some seven or eight species, perhaps more, actually do commit depredations in books. Besides, these creatures are not restricted in their diet to books. Dry food of no kind comes amiss, and one of the species which the author refers to, *Dermestes lardarius*, has received its specific name on account of the fact that it delights chiefly in bacon. *Anobium panicum*, another beetle, is fond of books; but it feeds upon almost anything that comes in its way; the most singular food recorded as having been sought out by this exceedingly omnivorous insect is cayenne pepper.

Several other beetles and their larvæ fairly come under the designation of bookworms; and, indeed, it is only in this class of insects that we meet with species capable of producing those elaborately curved tunnels which often disfigure old books, and of which one or two samples are figured by Mr. O'Connor. When uninterrupted in their ravages, some of these beetles are able to progress through the interior of books for quite a long distance, eating their way before them like an earthworm boring through the soil. Messrs. Kirby and Spence, and also Mr. O'Connor, quote an instance of a bookworm which traveled through no less than twenty-seven folio volumes in so straight a tunnel that, by passing a string through the perfectly round hole that it had made, the entire set of volumes could be lifted at once.

To the popular mind the term "worm" implies anything of a smallish kind that scuttles, wriggles or crawls; and with this notion is blended an idea of voracity and omnivorousness. We may fairly therefore put down, as does Mr. O'Connor, the "silver fish" among the category of bookworms. This creature, *Lepisma saccharina*, is, of course, not a beetle, but a representative of that archaic group of insects, the *Thapanura*; it is quaintly described by Hooke in his "Micrographia" as "a small white silvershining worm or moth, which I found much conversant among books and papers, and is supposed to be that which corrodes and eats holes through the leaves and covers. It appears to the naked eye a small glittering pearl-colored mooth, which, upon the removing of books and papers in the summer, is often observed very nimbly to scud, and pack away to some lurking cranny, where it may the better protect itself from any appearing dangers." Unlike the black-headed bookworm, *Ptinus* fur (which it has been suggested acquires its black head from its partiality to black letter books), the *Lepisma* lets printed matter severely alone, and carefully eats round it. The object of the *Lepisma* seems to be rather the paste than the paper or the binding. But it is not select in the matter of diet; and, among other foods, shares with the clothes moth a taste for garments and carpets. It has furnished Hooke with some physiological reflections which we quote from Mr. Butler's "Our Household Insects." "When I consider," observes the author of the "Micrographia," "what a heap of sawdust or chips this little creature (which is one of the teeth of time) conveys into its intrals, I cannot chuse but remember and admire the excellent contrivance of Nature in placing in animals such a fire as is continually nourished and supply'd by the materials conveyed into the stomach, and fomented by the bellows of the lungs; and in so contriving the most admirable fabric of animals as to make the very spending and wasting of that fire to be instrumental to the procuring and collecting more materials to augment and cherish itself, which indeed seems to be the principal end of all the contrivances observable in brute animals."

A less obtrusive though hardly less tiresome foe to the book lover is an insect which has been called the "book louse" (*Atropos divinatoria*). The term "louse," however, is unnecessarily offensive to the insect, for it is not parasitic and does not belong to the same group as that which contains the obscene pediculus. It is a Neuropteran, allied, therefore, to the dragonflies. It may be reasonably placed under the heading of bookworms—although Mr. O'Connor has not placed it there—owing to its partiality for paste. The specific name of the insect is connected with the fact that it shares with the death wate (a beetle) the habit of producing an ominous ticking sound, carrying terror to the hearts of the superstitious. It appears, however, that this is merely an amorous conversation with, or an act of adoration directed toward, the female insect, who is fascinated and overcome by this continued expression of feeling. This sound is caused by the insect knocking its head upon the ground, and it has been wondered, by those who underestimate the power of love, how so small and tender an insect can create so loud a sound. Nevertheless, it seems to be the fact that it does. The author, after dealing shortly with various kinds of bookworms (which are illustrated by not always very good figures), proceeds to the practical consideration of how to get rid of them. He is of opinion that (to speak somewhat hibernically) it is better to stop the mischief before it has commenced. Paste containing such a deadly element as corrosive sublimate is recommended for binding purposes; elsewhere we have seen the sugges-

* "Facts about Bookworms." By Rev. J. F. X. O'Connor, S.J. (London: Suckling & Co., 1898.)—From Nature; (Sci. Am. Supplement.)

tion that pepper is a useful article to mingle with the paste. But this would be obviously a substance of no use wherewith to confront that particular kind of bookworm which relishes a diet of cayenne. The general panacea for insects of all kinds is camphor. But here again the bookworm is not to be so easily combated. Specimens of one kind have been found comfortably and confidently nestling beneath pieces of camphor which it was hoped would put a speedy end to them. Possibly the best cure would be to put the books themselves to their legitimate uses, i. e., to read them. This would necessitate a constant shaking which would prevent the pest from obtaining a secure lodgment. But considering that the Royal Society of Science, of Göttingen, in the year 1744, and the Society of Bibliophile of Mons, in the year 1842, offered in vain a prize for the solution of these difficulties, it is not surprising to find that on the whole the bookworm has triumphed over both the bibliophile and the naturalist. In any case it has done us this service: it has furnished the material for a most interesting little book by Father O'Connor.

FRENCH MATCH WORKS.

In his report to the English Home Office, T. Oliver describes a visit to the match works at Aubervilliers, Pantin, and Prado, Marseilles. At the first, which is the oldest, 105 women and 95 men are employed in manufacturing the ordinary matches containing white phosphorus. The paste is mixed in covered iron vessels, fitted with exhaust pipes, which prevent the escape of all fumes. The matches are tipped by means of machine rollers fed mechanically with the paste, and provided with aspirating hoods, and are dried in thoroughly ventilated air-tight chambers. The boxes are filled by women in a separate room, and here the odor of phosphorus was strong, even at the other end, where the labelling and packing were being carried on. The separation of these departments into different rooms is recommended by the author. At Pantin, the manufacture of (1) ordinary matches, (2) of tison, a kind of safety vesuvian, which only strikes upon paper prepared with red phosphorus, and (3) of safety matches, finds employment for 400 women and 200 men, and though the methods are practically the same as those at Aubervilliers, the works are more modern and better kept. In the factory, Prado, Marseilles, 460 women and 80 men are employed, and about five millions of wax vestas and 20 millions of ordinary matches are made daily. No safety matches are made. The processes of mixing, tipping, and drying are carried on in a building detached from the rest, and by men only. "The tipping of the vestas is done by one man on a marble slab," provided at the front and one side with aspirating arrangements, which, however, were not in operation at the time of the visit, and consequently the odor of phosphorus was strong. The operator had worked 36 years at the process, and only been once away ill from some minor dental affection. Although the paste contains red oxide of lead, no symptoms of lead poisoning are said to have occurred in the work-people. The boxing is done by women, in well-ventilated rooms, on benches provided with aspirating gratings. In the boxing department for ordinary matches, where the arrangements are similar, there was considerable fume, due to occasional conflagrations. The dining-room is a separate block, with an outside covered passage, in which are hung on the wall large bottles filled with turpentine gargle. A well-appointed wardrobe for the women is provided, and each worker is supplied with a tin mug for drinking and gargling purposes. About 22 to 23 work-people are away through illness on the average each month. According to M. Desbrosses, women are much more easily fatigued and more susceptible to poisonous fumes than men. Three cases of necrosis were examined; all had lost teeth and a portion of the jawbone, but two were allowed to work in the splint department. The filling of the boxes when done by hand is more deleterious to health than any of the other processes and employs more hands, who are mostly women. The following are a few of the instructions which are printed and hung about the factories. Before

taking food, which is allowed only in the dining room, the working clothes must be left in the cloak-room, the hands washed with soft soap and water, and the mouth gargled with the gargle provided; the same precautions are to be observed on leaving work. The teeth are examined on prescribed days, and the hygienic regulations read out aloud once every month.

Applicants for employment must not be under 16 nor over 32 years of age for men and 28 for women, must show a certificate of birth and one of good moral character. They are examined by a doctor and required to be free from bodily infirmity, contagious diseases, to have been vaccinated or had small pox, and to have teeth in good order. The hours are from 6.30 to 11.30 a. m., and 1 to 6 p. m. and can be lengthened if necessary. In case of illness, a doctor's certificate is necessary before returning to work. At Aubervilliers and Pantin the work-people are medically examined once in every six months, and those with carious teeth are suspended or relegated to the splint department. In case of symptoms of poisoning without necrosis, such as anemia, malnutrition, loss of flesh, and albuminuria, 1 litre of milk may be ordered daily, but for the last 18 months this last measure has not been required, and whereas in August 1897, 15 men and 35 women were found to be suffering from simple dental caries, in February, 1898, there were only 4 cases of men and 12 of women. The commissioner appointed by the Academy of Medicine reports that since these regulations have been in vogue, i. e., from December 1st, 1896 to December 1st, 1897, there has not been a single fresh case of necrosis nor of general illness attributable to phosphorus poisoning in a population of 575.

According to Dr. Arnaud of Marseilles, phosphorus poisoning arises from absorption of the phosphorus vapor by the respiratory organs and probably too by the skin, and elimination by the various excretories after a more or less lengthened sojourn in the organism. Those who are subject to glandular enlargement, or are ill-developed, scrofulous, of weak constitution, and tending to tubercular disease, rickets, suffering from cough, heart disease, indigestion or albuminuria, and anemics and alcoholics are specially liable to the disease. Dr. Arnaud knows of several people, however, who have been exposed to phosphorus for 10, 20 and 30 years, who have been free from the disease and kept the appearance of good health. From 1884 to 1896 there were 4 cases of confined necrosis, one individual died, 13 of incipient necrosis and 57 cases (1890-95) of inflamed gums, dental abscesses, penetrating dental caries, and fistulous openings.

The wooden matches contain 11, and the vestas 5.7 per cent. of phosphorus. The latter are tipped cold, and there is less odor of phosphorus in the boxing and a more general appearance of health among the hands.

The French Government since March 1898, have succeeded in making a match free from white phosphorus and capable of striking anywhere. It is said to contain a modified form of red phosphorus, but as yet the unreliability of the chemical composition and the difficulty of making the paste in large quantities have prevented its becoming a general industry.

CONSUMPTION OF POTASSIUM CYANIDE.—The older, crude amalgamation process for extracting gold in S. Africa has been displaced nearly everywhere by the cyanide process. The consumption of potassium cyanide in the Rand district is at present about 10,000 tons per year. The salt is furnished almost exclusively by Germany and England. (Südd. Ap. Ztg.)

CARBOLIC ACID IN TABLET FORM is obtained by melting on a water bath 95 parts of phenol and 5 parts of stearin soap. The mixture is poured into cold moulds, and can later be sub-divided as desired, in tablet form. The tablets are readily soluble in water, and keep well. (Südd. Ap. Ztg.)

CLAY AS A SURGICAL DRESSING.—Dr. Stumpf has obtained excellent results in the application of clay as a dusting powder in the treatment of wounds. Its usefulness depends principally on its absorptive power. It is used preferably when sterilized at about 150° C. (Ap. Ztg.)

(Special Correspondence.)

PHARMACY IN AUSTRALASIA.

Sydney, Sept. 19, 1898.

The Victorian Parliaments are at present discussing a new Poisons Bill, which looks like having a safe and easy journey through both Houses. It is a very stringent measure, and in its first clauses proposed to repeal absolutely the Exemption Section in the existing Poisons Act of 1876 and amending act of 1895. It does not apply to the sale of any poison when made up as a medicine by a legally qualified medical practitioner, or by a registered pharmacist or chemist according to the prescription of a qualified medical man. It does not apply to homeopathic medicines unless in a crude state, or of a greater strength than the "decimal potency." Pharmacists who prepare poisons for patients are subject to all the provisions of the bill. It does not apply to proprietary medicines, photographic materials, veterinary medicines, poisoned seed and poisonous mixtures for the destruction of vermin, fly poison papers, or the sale of poisons by wholesale dealers where an order in writing has been given for the supply of the same. Records and names must be kept in every instance where the pharmacist finds it necessary to use a poison label. The maximum penalty for breaches of the measure is fixed at £20 and the onus of proving, in any prosecution, that the article does not contain poison is thrown upon the defendant. It is only necessary for the prosecuting party to prove that such and such an article or material is reputed to contain poison. The Melbourne pharmacists are seeking a modification of the clause which forbids prescribing to the bill the sale of poisons. Clearly, the doctors have had a big say in the drafting of the bill.

In consequence of there being no law in existence in Victoria by which the new British Pharmacopoeia can be recognized, the Melbourne and Sydney Medical Society and the Pharmacy Board have asked the Government to introduce and pass a short bill giving effect to the new publication.

The New Zealand House of January next has been fixed as the date of the adoption of the new "B. P."

Matters pharmaceutical in Sydney are very mixed. The members of both bodies, i. e., the Pharmacy Board of New South Wales and the Pharmaceutical Society, are all at sixes and sevens. The split in the ranks which showed itself nearly two years ago has widened very considerably. There are two distinct parties, and they are in a constant process of indulging in the most "battering-magery." The "D" men, of whom I wrote you in my last letter, were outvoted for membership of the Pharmaceutical Society on the ground that they had not passed a satisfactory examination. Perhaps the "D" men wish to explain that the "D" men speak of them for purposes of brevity, are the class of Apprentices, Assistants and others who have been allowed registration by the Pharmacy Act as a recognition of vested rights. In previous years they have explained the conditions governing their claims to registration.

As a retaliative move, these men are forming a new society under the title of the Society of Pharmacists of New South Wales. They elected as president, Mr. R. T. Bellemey, ex-president of the Pharmacy Board and Pharmaceutical Council. Mr. Bellemey refused to allow himself to be nominated last month for a second term as president of the Pharmacy Board, and his chair fell to the honor of Mr. L. P. Williams, who was defeated for the office last year by Mr. Bellemey. This latter gentleman has notified the Council of the Pharmaceutical Society that he is seceding from it at the end of the year, as the result of the society's refusal to admit to its membership all legally registered men. The new society bids fair to oust the old society. Mr. Bellemey's seceding will undoubtedly result in the Society to a very great extent for he will be followed by quite a large number of its present members. At the last Pharmaceutical Society election in March there were only 120 financial members, and "D" men who have been shut out from the society, number 250. With the retirements from its existing body, the new society will start with fully 200 members.

The latest burst-up between the Pharmacy Board and the Pharmaceutical Council is the outcome of the proposed new system of university tuition for the students in pharmacy. A deputation from the Pharmacy Board and the Council interviewed the professors at the university in June last and discussed the question. Subsequently the Registrar of the University wrote to the Pharmacy Board a synopsis of the curriculum, conditions and fees upon which the pharmaceutical students would be taken in 1899. The Council of the Pharmacy Board, at the letter being addressed to the Pharmacy Board, as they claim to be the only body entrusted with the control of the aspiring pharmacists' education. Without consulting Mr. Bellemey, the president of the Pharmacy Board, Mr. L. P. Williams, the president of the society, took the board's letter and replied to the university on behalf of the council, accepting the professors' proposal. The Registrar of the University very properly ignored the letter from Mr. Williams.

When the Pharmacy Board met on the 8th inst., Mr. Bellemey fairly "raised Cain" for Mr. Williams's daring to reply for the Pharmacy Board to the Registrar of the board. In answer to Mr. Bellemey, Mr. Williams was forced to admit that the university Registrar had had no correspondence with the Council. Mr. Bellemey thereupon characterized Mr. Williams's action as most presumptuous and unwarranted. To make matters worse

—and it was a most invidious thing for the new president of the Pharmacy Board to even entertain—Mr. Williams tabled a motion asking the board, on behalf of the council, to adopt the university curriculum. Mr. Bellemey and the other members of the Board threatened to leave the room if the motion was put to the meeting. Had they left the room there would have been no quorum, consequently Mr. Williams dropped his motion for the time being. Mr. Williams and Mr. Brothwood (an English minor man), insisted that the Registrar of the university had made a mistake in addressing his letter to the Pharmacy Board. Mr. Bellemey challenged their contention, and after a heated and stormy discussion, the whole question was postponed.

After the meeting Mr. Bellemey wrote to the University Registrar upon the subject, and received the following reply: "University of Sydney, 18th Sept. 1898. In reply to your letter yesterday, I beg to inform you that my letter of June 8 was addressed to the Registrar of the Pharmacy Board. It related to the matters discussed at an informal meeting of university teachers, which members of the Pharmacy Board, as I understand, in reference to the necessary course to be taken for carrying out the provisions of a part of Section 11 of the Pharmacy Act. It was not understood that the Pharmacy Board or Society had shared in the discussion, as that society does not appear to be named in the particular section of the act referred to. Yours faithfully, J. H. Barff, Registrar. R. T. Bellemey, Esq., Kensington." This letter settles absolutely the point at issue. It knocks the bottom out of the stand taken by Messrs. Williams and Brothwood, and upholds the position maintained by Mr. Bellemey.

It may reasonably be asked by readers of the Era why there should be such a flare-up between two pharmaceutical bodies so closely allied, and whose functions and interests are so interwoven in the pharmacy advancement of the community. The reason is not far to seek, and when you have it you will agree with the determined, regular and lawful attitude assumed by Mr. Bellemey.

The Society is a private institution, the Pharmacy Board a public institution, and the latter under statute law. But here's the point underlying the anxiety of the Council of the Society to have control of the students. In the course of the warm discussion referred to above, Mr. Brothwood very cleverly drew by Mr. Bellemey into making the admission, "that the Pharmaceutical Society, if it had the power of passing the students on to the university, could add materially to its revenue." In other words, the university would have to pay a course fee fixed at twenty guineas, and the society would charge the students twenty-five guineas and thus make a clear five guineas out of each student. Mr. Brothwood saw that he had made a mistake, and he said, "I speak let 'em eat out of the bag," much to the chagrin of Mr. Williams, who, more cunning and astute than Mr. Brothwood, tried to modify the admission by speaking of a small moiety of the pressed oil. The "D" men are now in arms now against the Pharmaceutical Society having any hand at all in their university tuition. What else could be expected? The poor devils will find it a tough job to raise the university out of the hands of the "D" men. They have to look to their masters for the fees. Prior to the Pharmacy Board meeting of the 8th inst., the students were supporting the Council's move, unconscious of the intrigue to be played off from them. The "D" men, however, the Council and are standing firmly by Mr. Bellemey, who characterises the action of Mr. Williams and his Pharmaceutical Council clique as the most disgraceful proceeding ever attempted in the pharmaceutical history of New South Wales.

In the New Zealand House of Representatives the other day a member complained of the Customs anomalies and the increase in fees. Mr. Seddon, Premier, in answering questions and is ever ready with his tongue, replied that the tariff had made a reduction on the working class necessities of £115,000, the result of the reduction in medicine and drugs in order to prolong the lives of the people. This fairly brought down the House, and the questioner fell flat and subsided.

The pharmacists in Wellington, N. Z., have unanimously agreed to close their premises every night at 9 o'clock. This early closing movement came into force on the first of August, and has been strictly adhered to by every registered pharmacist since that date. It is said that the public are in the habit of the action.

There is a tremendous lot of cranks in New Zealand, and many of them are pharmacists. At a recent meeting of the Central Pharmaceutical Association in Wellington, the members expressed their opinion that there was "too much of the hole-and-corner business about chemists' meetings." Their own meetings bear in mind. "The wharf laborers, the tailors and the bootmakers, had the right meetings, and they were in the daily press, and why shouldn't we," is a sample of the stuff that was fired off at the chair. It was agreed that the secretary should supply reports of the meetings to the daily papers. If any pharmacist has any new idea, or any of these pill men pay for the little luxury of having their names dished up in the dailies.

Mr. W. C. Fitzgerald, pharmacist and public vaccinator of New Zealand, who has been sued for damages some months back for alleged unskillful surgical treatment of a man who fell into a coal bulk and had his face dreadfully damaged, figured again in the Supreme Court as defendant in a charge of unskillful treatment in vaccination. The plaintiff, Olive Roberts, an infant, through her

mother, sought to recover \$3,000. The pleadings set out that the child was vaccinated in October, 1897, by the defendant, who failed to take precautions against the introduction of septic matter into wounds, with the result that the child contracted syphilis. The defence was a denial of negligence or want of skill in the operation. The hearing of the case occupied seven days, voluminous medical evidence being given against Mr. Fitzgerald, who is the bete noir of the Wellington doctors. The jury found for the defendant. The case was a most extraordinary one. The mother of the child, a woman under twenty years of age, admitted giving birth to a child at sixteen years of age. That child died in convulsions, its body being a mass of white sores. Her second child died soon after birth. She also stated that a young woman named Dobson gave birth to a child in her house, and didn't live very long and was buried in the back yard. The mother died in the hospital from abscesses in the side. Mr. Fitzgerald, who, by the way, was surgeon on the ships *Ovari* and *Rakaia*, asserted through his counsel at the trial that the case had been "faked" up against him by the doctors. His law costs amounted to \$3,675, and he is now petitioning the New Zealand Government, as Government Vaccinator, to be recouped these heavy costs.

Eight years ago a well known Queensland pharmacist named Lale sold his business and came to Sydney. Just then the famous maritime strike was in full swing in Sydney. Lale joined in with the wharf laborers and was always prominent in the skirmishes with the police and military. Since then nothing has been heard of him. His relatives applied to the Queensland Supreme Court last month for a declaration that he was dead, so that his estate would be at their disposal and for their benefit. The judge granted the application. It is quite possible that Lale, who is described by his relatives as eccentric, might be somewhere in the United States and very much alive.

Dr. Rennie, M.A., D.Sc., Professor of Chemistry and Lecturer on Metallurgy at the Adelaide University, will shortly visit the United States as Special Government Commissioner to inquire into and report upon the teaching of chemistry and metallurgy in the United States.

DETECTION OF WATER IN CHLOROFORM AND ETHER.—If a saturated aqueous solution of potassium iodide be added to a solution of 1 Gm. of lead nitrate in 10 Cc. of water, until the precipitate first formed is just redissolved, the double salt, Pb_2I_2KI separates out after a few minutes in form of white, fine crystals of silky luster. They are purified by washing with absolute alcohol and dried over calcium chloride. In contact with the slightest quantity of moisture, they assume a yellow color. For this reason the salt is a very sensitive reagent for traces of water in chloroform and ether. (Südd. Ap. Ztg.).

GILDING OF GLASS AND PORCELAIN.—The following method is stated to give excellent results. In place of the ordinary mixture, a solution of gold chloride in oil of turpentine or oil of lavender, containing a little bismuth subnitrate and chromium soap is used in these proportions: Oil of lavender, 900 p.; gold chloride, 100 p.; bismuth subnitrate, 5 p.; chromium soap, 50 p. After application, the article is dried, and then burnt in a muffle furnace. The gilded parts require no further treatment. (Südd. Ap. Ztg.)

GUAIACOL AS TOOTH-ANÆSTHETIC.—Dumont (Nouv. Rem.) uses guaiacol with great success for performing painless tooth operations. The method used is as follows: By means of a wad of cotton, saturated with guaiacol, the mucous membranes are rendered anæsthetic, so that the needle may penetrate at various places without causing pain. Anæsthesia lasts long enough for extractions and short operations. No disagreeable secondary effects, such as noticed at times with cocaine, ever take place. (Ap. Ztg.)

KIL is the name given by the Tartars to mineral found on the banks of the Black Sea. It consists of silica, alumina, ferric oxide, calcium carbonate, and magnesium carbonate. Mixed with water, it forms a white, sticky mass, and is used by the natives in place of soap. The *Semalne* Medecale proposes to sterilize the mineral by heating, and use it as an ointment base for skin diseases, for which it is said to be well adapted. (Südd. Ap. Ztg.)

PENCILS FOR WRITING ON GLASS.—Black: Tallow, 2 p.; yellow wax, 3 p.; lampblack, 2 p.—Blue: White wax, 1 p.; tallow, 2 p.; Prussian blue, 3 p.—White: White wax, 2 p.; tallow, 1 p.; Kremsier white, 2 p. (Drog. Ztg.)

QUESTION BOX

The object of this department is to furnish our subscribers and their clerks with reliable and tried formulas and to discuss questions relating to practical pharmacy, prescription work, dispensing difficulties, etc.

Requests for information are not acknowledged by mail, and ANONYMOUS COMMUNICATIONS RECEIVE NO ATTENTION; neither do we answer queries in this department from non-subscribers. In this department frequent reference is necessarily made to information published in previous issues of the Era. Copies of these may be obtained at ten cents each.

Bismoline.

(W. J. J.) Who makes it and what are its medical properties?

Capitol.

(G. C. D. L.) Capitol is said to be a condensation product of tannin and chloral prepared by a patented process. See this journal, February 17, 1898, page 256.

Matzoon: Kumyss.

(W. S. R.) "Matzoon" is a proprietary preparation of fermented milk. We cannot give the formula. A process for the preparation of kumyss may be found in the National Formulary, (No. 195). A formula is also given for "kephyr-kumyss."

Sudorific Ointment.

(L.) The so-called sudorifics or agents producing profuse sweating, as pilocarpine, ipecac, etc., are seldom, if ever, prescribed in ointment form; and we know of no remedies of this character which may be satisfactorily administered by external application.

Lapactic Pills.

(L. G.) Lapactic pills are manufactured by Sharp & Dohme, Baltimore, who state that they introduced them about twelve years ago as a tonic-laxative in chronic constipation and a tonic dyspepsia. They give the following formula: Aloin, S. & D., $\frac{1}{4}$ grain; strychnine, 1-60 grain; extract belladonna, 1-S grain; ipecacuanha, 1-16 grain.

Germol.

(Subscriber.) Germol is a proprietary disinfectant, imported by Read Hollday & Sons, Ltd., of this city. In an opinion rendered by General Appraiser Lunt some time ago as to the rate of duty chargeable on an importation of "germol" it was stated that "germol is a fluid composed of dead oil, rosin (both known as distilled oils), combined with some alkali, and forming a saponaceous chemical compound soluble in water." It is recommended as a germicide and disinfectant.

Trional.

(Subscriber.) Trional is an analogue of sulphonal and differs from it by the substitution of an ethyl group for a methyl group; it is prepared exactly like sulphonal, except that methyl-ethyl-ketone is used in place of acetone. Trional form colorless, shining, tabular crystals, melting at 76° C., soluble in 320 parts of cold and freely in hot water. According to Coblenz ("The Newer Remedies"), it is preferred to tetronal as a reliable and safe hypnotic. The process of manufacture is patented.

New Jersey Board of Pharmacy.

(W. H.) The next meeting of the New Jersey Board of Pharmacy for the examination of applicants for registration as pharmacists and assistants will be held in Trenton, January 10. Applicants for assistants' certificate must have had three years' practical experience, and be not less than 18 years of age. Examination fee for assistants, \$5. In case of failure to pass a satisfactory examination, the applicant will be granted a second examination (without the payment of another fee) at any time within one year.

from the first examination. For further particulars and application blank, you should address the secretary of the board, Henry A. Jorden, Bridgeton, N. J.

Red Coloring for Toilet Preparations.

(S. B.) Use liquid cochineal, solution of carmine, tincture or compound tincture of cudbear, tincture of red saunders, etc. The following coal tar colors have also been recommended as producing satisfactory shades of red; they are said to be harmless; Fuchsin, acid fuchsin, roccellin, Bordeaux, ponceau, erythrosin, eosin and phloxin. A little experimenting is necessary to determine which of the above substances will work best with the preparations you name. We suggest the addition of liquid cochineal for tinting the hair lotion and tooth wash.

Cascara Preparations.

(W. H. S.) Your various questions are pretty fully answered in a paper by Luther F. Stevens on "Cascara" in this journal, September 2, 1897, page 298. Freshly slaked lime has been recommended for the preparation of a bitterless cascara by Leo. C. Urban of Milwaukee, who claims that the resulting fluid extract possesses the cathartic properties of cascara to a marked degree. See this journal, February 25, 1897, page 237. Tablets of extract of cascara are easily made. The dried and powdered extract should be used, half its weight of licorice powder added, and a trace of a lubricant oil sprayed over the powder. Compressed tablets may also be made containing fluid extract of cascara. The tablets ordinarily made and listed by manufacturers are those containing 1 and 5 grains extract and 1 minim of fluid extract.

Spirit Nitroglycerin Percentage Solutions.

(H. K. C.) It is impracticable to attempt to prepare ten per cent. solution from the ordinary one per cent. solution of nitroglycerin. You can dilute the stronger solution to make a weaker one, but it is too dangerous to attempt to evaporate the solvent or to add nitroglycerin to the official solution to increase its strength. Nitroglycerin for medical purposes is usually procured by manufacturers directly from the factory where it is made in form of a ten per cent. solution in alcohol. Such a solution is non-explosive, and may be diluted with official alcohol to any lower percentage strength. The U. S. P. preparation contains one per cent. by weight of nitroglycerin.

An exposition of the methods employed in calculating percentage solutions appeared in this journal May 13, 1897, page 572. A table of the more common percentage solutions may be found in the Era Dose Book and Reference Tables, a book you should have.

Liquid Depilatory.

(H. L. H.) We know of no satisfactory formula for a depilatory in liquid form containing one of the sulphides. All of the depilatories depending for their action upon the presence of a sulphide and a caustic alkali are applied as a paste freshly prepared. A typical formula is the following from Martindale: Barium sulphide (in fine powder) 1 to 3 parts; powdered starch, 3 parts. Mix. Make into a paste with water at the time of using, spread over the part required, and remove at the end of five or ten minutes. The following, from the Pharm. Post, is a formula for a

Liquid Depilatory.

Tincture iodine	6 parts
Oil turpentine	6 parts
Castor oil	8 parts
Alcohol	48 parts
Collodion	100 parts

To be used once or twice daily for 3 or 4 days. The film formed is then pulled off rapidly, so as to take the hair with it.

Rose Leaves for Pot-pourri.

(F. W. K.) The preparation of fresh rose leaves for pot-pourri is very simple. After they are collected and spread thinly on porous paper they are exposed to the sun until sufficiently dry; they may then be mixed directly with other odorous ingredients or, as some prefer, be packed in layers in jars, each layer alternating with a

very thin layer of common salt. Powdered orris root and extracts and many other ingredients may be added according to taste. The following formula for a mixture to be prepared at home has been published: Take a 2-gallon jar and fill it with rose-petals, orange blossoms and lavender flowers, sprinkle them well with salt, and disperse through the contents 4 ounces of any pot-pourri which does not contain the dried flowers. If lavender and orange flowers are not obtainable, the powder should contain oils of neroli and lavender. The Era Formulary gives the following for mixing with rose leaves: Tonka bean, $\frac{1}{2}$ -ounce; cinnamon, pimento, of each 1 ounce; coriander 4 ounces; benzoin 5 ounces; orris root 1 pound. Reduce to powder, mix, and add $\frac{1}{4}$ dram essence of bouquet.

Quinine, Solution of Potassa and Tincture Ferric Chloride.

(G. P. D.) asks criticism upon the following prescription:

Quinine	2 drams
Solution potassa	$1\frac{1}{2}$ drams
Tincture ferric chloride	4 drams
Tincture nux vomica	$1\frac{1}{2}$ drams
Shakers' Extract Malt	$1\frac{1}{2}$ ounces

Mix: Teaspoonful three times a day.

When he put it up there was produced a "heavy, white-like precipitate." He sent the mixture out under a shade label, but was not satisfied with his work.

The prescription is incompatible, and should not be compounded. Solution of potassa precipitates quinine, the alkaloids of nux vomica, and tincture of ferric chloride. Reactions also occur between extract of malt and solution of potassa and tincture of ferric chloride, their character depending upon the order of mixing and the composition of the extract of malt, which, in this instance, is a proprietary preparation whose formula is not given.

Terms Employed in Volumetric Analysis.

(W. M. L. W.) "Titration, titer, and indicator" are terms employed in volumetric analysis. Titration may be defined as the process of adding the volumetric solution from the burette to the solution of the weighed substance until the reaction is completed. To "titrate" a substance would, therefore, mean to test it volumetrically for the amount of pure substance it contains. The term "titer" is used to designate the strength of a volumetric solution in active reagent per cubic centimeter or liter. Both words are derived from the French "titre," meaning "standard of fineness." An "indicator" is a substance added to enable us to ascertain by a change of color (or other equally marked effect) the exact point at which a given reaction is complete. The Pharmacopœia gives processes for preparing test solutions of this character. You will do well to consult that work, and also some good text-book or reference work on volumetric analysis. Schimpf's "Text-Book of Volumetric Analysis for Pharmacists" and Sutton's "Hand-Book of Volumetric Analysis" may be recommended. See also Era Course in Pharmacy.

Distinctions Between Algae and Fungi.

(W. M. L. W.) It is impossible to lay down accurate lines of demarcation between these sub-divisions of the cryptogamia or flowerless plants. Botanists differ greatly in their use of these terms; but according to Thomé ("Structural and Physiological Botany"), it may be stated broadly that Algae contain chlorophyll, and are therefore able to avail themselves of inorganic food materials; while Fungi contain no chlorophyll, and are therefore not able to make use of absorbed unassimilated food-materials, but are compelled to live as parasites on other organisms, or on organic remains. A related class of the same sub-division of cryptogams are Lichens, which assume an intermediate position, uniting in themselves the characters of Algae and Fungi.

Botanists are divided in opinion whether the Fungi have developed independently from a common origin or are a heterogeneous group, that has resulted from the degeneration of different chlorophyll-bearing plants. Clark, in discussing this subject, says ("Laboratory Manual of Practical Botany") the weight of authority seems to be

in favor of this latter view. So strong is the resemblance in the life history of many of the Fungi to algal forms, that both are placed in the same classes in some schemes of classification, the Fungi being treated simply as degenerate forms of Algae.

Lavender Salts.

(A. H. S.) We cannot give the formula for the proprietary article. Some one of the following may answer your purpose:

Ammonium carbonate, in small pieces	a sufficiency.
Oil of lavender, English	1 dram
Absolute alcohol	4 ounces

The ammonium carbonate is washed on a strainer with absolute alcohol, to remove all powder; it is placed in bottles, which are then filled up with the solution of oil in alcohol. The alcohol used for washing should, of course, be filtered and used with the oil.

"Pharmaceutical Formulas," in commenting upon a similar formula, says the carbonate of ammonium should be carefully selected. Specially compressed cubes are now obtainable. The globular form of filling is sal prunella. Opal glass balls serve just as well. There is no reason why the lavender perfume should be strictly adhered to; any of the essences may do as well if alcoholic solution of ammonia is used to make them. The essence must be strongly alcoholic, otherwise it dissolves the carbonate and makes the bottle "messy." A little rose or neroli may be added to the lavender, to round it off a little, and the solution may be tinted with a mixture of phenylene and methyl blues (violet), cudbear tincture (red-blue), eosin-yellow (yellow), and safranin (pink); and green may be obtained with the blues and eosin-yellow.

Some years ago a German exchange published this formula:

Ammonium carbonate	120 grams
Spirit of ammonia	60 grams
Oil bergamot	12 drops
Oil lavender	8 drops
Oil cloves	4 drops
Oil neroli	4 drops
Oil cinnamon	4 drops

The ammonium carbonate, which should be quite fresh, and in lumps about the size of a hazelnut, is put into a wide-mouthed jar. The oils and ammonia are then mixed and poured into the jar, and the stopper at once applied. Set aside for two days, at the end of which time the ingredients will be found to have united in a solid mass.

Creolin; Lysol.

(E. L. A. B.) There are a great many preparations of cresol which have been introduced as antiseptics in surgery. Coblenz' "Newer Remedies" giving a list of some twenty or more. The cresols, of which three isomerides exist (ortho, meta, para), are homologues of phenol and derivatives of toluene. All the cresols possess a creosote odor, their antiseptic properties are said to be superior to phenol, and they are far less poisonous. The work above noted gives the following information concerning creolin and lysol: Creolin is said to be an emulsion of cresol, obtained by means of resin soap. It consists of a brownish-black, syrupy, liquid, which, when mixed with water, forms a more or less turbid mixture; with alcohol, ether, or chloroform, it forms a clear solution. Creolin is employed in the pure condition, as a 1 to 2 per cent. solution; in ointments, dusting powder or dressings, 10 per cent.; internally, it is administered in capsules containing 5 minims.

Lysol is prepared from the fraction of coal tar oil, which boils between 190° to 200° C., by dissolving it in fat and subsequently saponifying it with the addition of alcohol. It forms a clear, brown, syrupy liquid, containing 5 per cent. of the cresols; it is miscible with water, forming a clear, saponaceous frothing liquid. With all other solvents it is miscible in all proportions. Experiments have shown lysol to be five times stronger than carbolic acid in antiseptic power. The strength of the solution employed is usually 0.3, 1 or 2 per cent.

To the above information regarding creolin may be added the statement that there are two chief preparations on the market, Pearson's (from England), and Artmann's

(from Germany). Concerning these preparations, King's American Dispensary, just published, states that the former is perfectly soluble in ether and in the cold, and particularly in the presence of ice, deposits naphthalene in hard, white crystals; the second is but sparingly soluble in ether, and contains less phenol than the English product. Both contain phenols in combination with soda, by means of which the hydrocarbons present are probably held in solution. Pearson's contains 60 per cent. of hydrocarbons; Artmann's, 55 per cent.

Galenical Defined.

(W. M. L. W.) The definitions given by the various dictionaries are not uniform, but as generally understood galenical preparations are those prepared by methods which do not include any chemical reactions or changes. The name is derived from Galen, a celebrated physician who lived in the second century, and whose teachings were of the highest authority for a number of centuries. His medicines were limited to teas, decoctions, tinctures, etc., the preparation of which was in no way dependent upon a knowledge of chemistry, a science which was unknown at that time. Chemicals were not introduced into the materia medica until a much later date.

When the constituents of the preparation are simply mixed, or when the active principles of a drug are extracted by means of simple solvents, the product is a galenical preparation, and the method of preparing it is a galenical process. Here are definitions from a number of authorities. You can take your choice.

"Standard Dictionary": Galenic pharmacy, the preparation of medicines by physical means, as infusion and decoction, as opposed to chemical, as synthesis and decomposition.

"Century Dictionary": The Galenic (as opposed to chemical) remedies consist of preparations of herbs and roots, by infusion, decoction, etc.

"Imperial Dictionary," London: The Galenic remedies consist of preparations of herbs and roots, by infusion, decoction, etc. The chemical remedies consist of preparations by means of calcination, digestion, fermentation, etc.

"Encyclopaedic Dictionary": Pertaining to Galen, a celebrated physician, born at Pergamus, A. D. 131, and said to have died at Rome about A. D. 200, or his method of treating diseases; remedial.

"Worcester's Dictionary": Relating to Galen, etc.

"Gould's Dictionary of Medicine": Medicines were said to be Galenic (a) when they were of vegetable origin, and not chemical or spagyric; (b) when they were designed for the use of human patients, and were not veterinary; (c) the term was often nearly equivalent to medicinal or official, in the modern sense of the latter word.

"Dunglison's Medical Dictionary": Used substantially, for drugs that were not chemical.

"Keating's Dictionary": Especially applied to the use of vegetable remedies.

"Thomas' Medical Dictionary": After the manner of Galen, whose practice of medicine was remarkable for multiplying herbs and roots in the same composition.

Some additional interesting information concerning the use of the word may be found in the Journal, February 21, 1895, page 239.

COD LIVER OIL EMULSION.—A formula given in Bull. de Therap. is as follows. Cod liver oil, 500 p.; powdered sugar, 100 p.; powdered gum arabic, 5 p.; powdered tragacanth, 500 p.; infusion of coffee, 200 p.; rum, 100 p. The sugar, gum arabic and tragacanth are mixed in a mortar. In a bottle, that is to contain the emulsion, the cod liver oil and cold coffee infusion are mixed by agitation and a part of this mixture incorporated by trituration with the contents of the mortar until a semi-fluid, plastic mass is obtained. The rum is then added to the remaining contents of the bottle, the mixture shaken, and gradually incorporated with the emulsion in the mortar. (Ap. Ztg.)

GREASE-SPOT EXTRACTOR.—Stronger ammonia, 20 p.; tincture of quillaya (20 p. e. in alc. ol.), 30 p.; ether, 30 p.; benzoin, 150 p.; alcohol, 500 p. (Dr. Ztg.)



RS

The Pharmaceutical era

SERIAL

1

D7532

v.19-20

Medical

Medical

71 1s

